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FOOD MANUFACTURE

Vol. XII, No. 9 September, 1937

Coloured Water

THE *obiter dicta* of the medicine men are greedily pounced upon by the layman (via his favourite paper), in many cases without reference to their context. One eminent gentleman complains bitterly of the over-eating he noticed at his Belfast hotel. Another one complains that he would have no patients if he told the over-carbohydrated ones not to eat so much. His method is to give her (*sic*) a bottle of coloured water with the instruction that such "medicine" requires auxiliary treatment in the way of reduction of food. This, he alleges, does the trick. His phraseology, be it said, is more pontificial than ours. The application of the Jesuitical method may, in these cynical days, defeat its object. People are becoming less and less subject to being fooled unless such fooling is bolstered up by National Advertising. There are other patients besides neurotic old ladies. Whilst relying on the faith factor in many cases, the very word "faith healing" is still anathema to the rank and file, although there are signs of apostasy in the medical camp. Apart from much "blowing of the gaff", the spread of "education", the dissemination of the deliberations of the medical bodies and the greater use of the word "why" on the part of patients, have reduced the holding power of the bottle of coloured water.

Professor R. J. Johnstone, M.P., of Belfast, says, "Perhaps in the future, all difficulties will be solved by the establishment of a State Medical Service. Like *good democrats*, we shall always oppose it". We would like to know what, as good scientists, they would do.

Sir Kaye Le Fleming says that it is not in the public interest that health matters should receive the attention of politicians until and unless such questions have been matured in the medical mind. When, in Heaven's name, will that be? With regard to diet, the tremendous response to such "systems" as the "Hay Diet" demonstrates that the public is diet-conscious. But the doctors are timid. Obviously, they themselves have to eat. We cannot help feeling that, under a State Medical Service, they would be able both to eat and to quit fooling with coloured water.

The Passing of a Pioneer

How much the bread-eating community in general and Canada in particular owes to Sir C. E. Saunders, who has just died at the age of 70, history can only assess. At present it can be safely said that his discovery and development of Marquis wheat was largely responsible for the rise of Western Canada as the leading exporter of hard, spring wheat in the world. His father, Dr. William Saunders, was the founder and director of the system of experimental farms throughout Canada, and it was when experimenting with some of his strains that Marquis wheat was discovered. It proved an ideal strain for the Canadian prairies. Even with light rainfall it yields bountifully and ripens early. Saunders' method of testing strength was to chew small samples and thus obtain the gluten—a method used by many people to-day. In 1904, a few grains of the new wheat were planted and the entire harvest collected in an envelope. In 1916, it was the leading variety in the whole of the Canadian prairies, and so heavy was the yield that the elevator system was taxed to hold it all! Marquis was not the only valuable wheat developed by Saunders—his Ruby, Reward and Garnet strains all became famous. He was one of the few pioneers to receive any reward in their lifetime, and when he was compelled to retire owing to ill-health a grateful Government voted him an annual grant of £1,000 for life. Canada's position to-day in wheat production is largely due to his efforts.

Milk Marketing Amendments

The Minister of Agriculture has now announced his decision on the amendments put forward by the Milk Marketing Board and approved by milk producers twelve months ago. The matter has evidently been given a great deal of consideration if

the time taken to arrive at a decision is anything to go by, and even now it is doubtful if the decision will give entire satisfaction. Those farmers who hold licences to produce tuberculin tested milk are now to be brought into the marketing scheme and given a special minimum of 1d. a gallon in addition to the accredited premium of 1d. per gallon. This will probably not satisfy those who have been outside the marketing scheme, and who have been free from levies on account of milk for manufacture. We doubt whether the extra 2d. a gallon over the Board's pool price will prove sufficient inducement even to maintain, let alone increase, the production of tuberculin tested milk. There will be general agreement with the stabilisation of the producer retailer's levy at a lower level. The increase on this during the last two years has resulted in a rise in the retail price of milk in many villages and country towns and certainly has not been favourable to the increase in the consumption of liquid milk which is so desirable.

Night Baking

The working conditions of operative millers and bakers have ever been the subject of criticism. Apuleius about A.D. 170, in his story "The Golden Ass", wrote: "Ye Gods, what a set of men I saw! Their skins were seamed all over with the marks of the lash, their scarred backs were shaded rather than covered with tattered frocks, some only wore aprons, all were so poorly clothed that their skin was visible through the rents in their rags! Their foreheads were branded with letters, their heads were half shaved, they had irons on their legs, they were hideously sallow, their eyes were bleared, sore and raw from the smoke of the ovens, they were covered with flour as athletes with dust". Things are not so bad nowadays, but the question of night baking has exercised the minds of a number of reformers for a long time, and the Government eventually set up the Alness Committee to inquire and report on night work in bakeries. The report has now been made public.

The Report

This is about what most people expected. Lord Alness and his colleagues have found the drastic proposals of Mr. Banfield quite impracticable. They made exhaustive inquiries over a wide field and a whole mass of data was carefully checked. Witnesses were asked to give their opinions as to figures, numbers employed as a whole, and the number engaged on night work. These were checked through Home Office inspectors and real figures are now available. The Committee decided that Mr. Banfield's proposal of absolute prohibition is not only impracticable as a method of dealing with the question, but would inflict serious and even destructive consequences upon the industry. The report emphasises that abolition on the lines advocated by the Amalgamated Union would work inequitably, not only among large employers, but the majority of medium-sized bakeries, which would be faced with serious dislocation of business and could only maintain existing output by considerable capital expenditure which might prove uneconomical. Mr. Banfield's argument that other countries have abolished night baking carries very little weight because conditions abroad are very different from those in this country. Many countries have abolished all personal liberties and bowed the knee to absolute dictatorship and unadulterated officialdom. That will never happen here, and one cannot imagine a man being shut out of his own bakehouse by Act of Parliament in this country or conceive the creation of an army of inspectors running round to see the Act was enforced.

An Old Suggestion

A correspondent writing to the *National Association Review* on the subject states: "Personally I do not favour night baking, but cannot support a Bill for its abolition, because it means prohibiting a man from working in his own bakery at hours to suit himself". He then refers to a report in 1924 by Doree and Kirkland, of the National Bakery School, in which they dealt with the use of lactic acid in bread, and end with the statement: "If it ever should become law that bakers may not work at night the adoption of a process of this sort would enable bakers to save an hour or more in the morning and yet have quick process bread with all the desirable qualities of that made on a much longer system". This would appear to be a useful suggestion if night baking were prohibited, but in view of the Committee's findings it is very doubtful whether the Government will take any such action, although some further investigation into working conditions is likely to arise out of the Committee's calling the Government's attention to general conditions, which they consider are not all they might be or even what they should be.

Beer Boosting

The Americans appear to be more convinced that Beer is Best than we are over here where the slogan originated. According to the *Northwestern Miller*, in every row of advertising posters you can see the

bread and beer card. It is a handsome landscape painted in full colour, keynoting the relationship of the farmer to the brewing industry—" America's Farmers Supply Both Wheat for your Bread, Barley for Your Beer and Ale ", " Beer and Ale are Nature's Liquid Food ". These, and similar slogans, are employed in the tremendous beer drive in the States. It is probably the reaction due to Prohibition. We read the other day of a leading New York hotel recently serving a dinner in which practically every dish contained beer. We can understand this, but we really got a surprise when we saw the latest from a New York bakery journal. It is a recipe for Chocolate Beer Cake, which has " just enough difference from the conventional chocolate flavour to make it interesting ". It is an amazing recipe—1¾ lb. each of flour and sugar, 12 oz. fat, 8 oz. chocolate, 8 eggs, and a quart of beer! This concoction is baked, split and sandwiched with marshmallow and provided with a suitable top covering—we suggest an imitation frothy confection as a topping! This may be a most excellent cake, but we rather imagine that the general opinion in England will be that Beer is Best—in a tankard.

Lethal Meat

" Seventy-five old soldiers die every year from diseases contracted during the Spanish-American War of 1898, and most of them are attributable to the beef rations ", says Mr. Alexander Guise, who has prepared a report for the New York Spanish War Veterans' meeting in camp at Jamestown, New York (the *Evening Standard*). Reading such a statement may give the partakers of bully beef from 1914-1918 furiously to think, but they will have the consolation of knowing that whatever the infection was, they will be, like King Charles, an unconscionable time a'dying!

Seriously, these little injections of verbal poison cannot fail to have their repercussion upon the canned food trade. Apart from these, we were astonished to hear from a young lady that she had recently read Upton Sinclair's *The Jungle*. We also gather, from enquiries to various librarians of the public libraries, that this book is constantly in demand. We wonder whether this is due to the title, which might lead the prospective young reader to imagine that it is one of the Tarzan books! About a year ago we heard a lot about suggested propaganda for canned foods, but little seems to have been done, although a step in the right direction has recently been taken by the starting of Miss Janet Bond's Bureau. If the infection of a consignment of canned food by a human " carrier " occurred (an impossible thing due to sterilisation methods) what a nine days' wonder it would be. But the fact that quantities of bread were thus recently infected and produced disease in many consumers was not " news " and few people heard about it.

The opponents of canned foods have a right to their opinions and frequently air them. There is no big campaign against canned goods, but the constant drip wears away the stone. There is hardly a week goes by but canned food is parenthetically depreciated by speakers on the " wireless ". Are any canners aware that the young generation is reading *The Jungle*? Let them read the book to see what sort of propaganda it is. It doesn't matter what its date is—the suggestion works just the same. Judging from the tin-filled shop windows, we may possibly be accused of being alarmists, but we are satisfied that there is an appreciable section of the public who still declare that " they won't have a tin in the house ".

Taste Appeal

It has been recently said that the professional nutritionists could pay more attention to the matter of taste appeal. The somewhat variable standards for minimum diet may be approximately correct biologically, but the question is asked, " Do they take into account the human equation?" This opens up a big question. Obviously, however correctly balanced the proper constituents of food may be, the physiological effect may be affected by many factors. Among these are the preparation of the foods; the psychological state of the eater and his state of health.

Professor E. P. Cathcart, in the *B.M.J.*, lyrically suggests that it isn't so much what a person eats as the state of his mind whilst eating it. He sings:

> " Eat all kind nature doth bestow;
> It will amalgamate below.
> If the mind say so, it shall be so;
> But, if you once begin to doubt,
> The gastric juice will find it out."

The æsthetic aspect is important, although how far this affects the absorption of the different elements would be difficult to gauge.

The adjustment of food habits to changing temperatures is a feature of modern times. The recent heat wave has increased to an enormous extent the demand for light diet, such as salads, mayonnaises, sandwiches, and the like. The quantities given by one firm attain almost algebraical proportions.

Due reference to taste appeal has come by way of the caterers, without the aid of diet charts.

Chemists

Two American chemists, writing in the official publication of the American Institute of Chemists, are much occupied with definitions. One of them, Dr. Grosvenor, writes about the consulting chemist —and asks, "What is he?" "Where is he?" and "Where is he going?"

He takes exception to the contention he has read during the past few years in British chemical literature that a consulting chemist should have passed the examinations of the Institution of Chemical Engineers.

There is not space to follow his arguments, but Dr. Grosvenor's main point is that the most necessary weapons in a consulting chemist's armoury are "simplicity, hard work, receptivity, co-operativeness, imagination, scepticism, and ingenuity rather than the traditional (largely imaginary) dignity, superiority, big words and magical mystery". A tall order! Still we cannot see that the passing of a few examinations would prevent the acquirement —in time, at any rate—of the first list of attributes.

Dr. Grosvenor proceeds to dig a more modest definition out of a tome which gives the chemist as "one versed in the science which treats of the composition of substances and of the transformations which they undergo". Raymond E. Kirk, quotes the *Encyclopædia Britannica*: "Chemist, one who, for pleasure or profit, concerns himself with the acquisition of information relating to the composition of bodies and with the changes of composition which they undergo." He prefers his own definition (admitting its cynical tinge): "Chemist, one who says he is a chemist and persuades enough people to agree with him so that he is able to make a living". This is rather heart-searching, and we prefer a very old definition, culled from *Physica Subterranea*: "The chymists are a strange class of mortals impelled by an almost insane impulse to seek their pleasure among smoke and vapour, soot and flame, poisons and poverty." The old writer is evidently well content, as he adds: "Yet among all these evils I seem to live so sweetly that, may I die, I would not change places with the Persian King."

Food Investigation Board Report

The work of the Food Investigation Board of the Department of Scientific and Industrial Research, whose annual report for 1936 has just been published, is carried out in the interests of the general body of consumers in this country, and is directed to reducing waste and improving the variety and quality of foodstuffs generally available by the application of scientific knowledge to the problems of transport and storage.

Great advances have been made, the report states, in the past ten years in the carriage of foodstuffs under refrigeration. On the basis of the work carried out in the "experimental hold" at the Ditton Laboratory, where the conditions operating in a ship's hold at sea can be imitated, a new system of refrigeration by air-circulation, based on the use of a "jacket," has been developed and widely adopted, in various forms, in new tonnage, and new methods of stowing cargoes of fruit have been devised and tested under commercial conditions. Moreover, the carriage of chilled beef from Australia and New Zealand in gas-storage—*i.e.*, in an atmosphere containing about 10 per cent. of carbon dioxide, following the discovery of this method at the Low Temperature Research Station —has developed rapidly.

In these circumstances steps are being taken to secure data on the performance of these modern methods, in co-operation with the Councils for Scientific and Industrial Research of Australia and New Zealand, by means of an expedition to New Zealand and Australia. A large programme of work has been planned, embracing the study of conditions in spaces carrying frozen meat, chilled beef in gas-storage, cheese and fruit. The equipment carried by the expedition is considerable, and includes some 250 distant-reading electrical thermometers of special construction.

Cinnamon Sugar for Cinnamon Toast

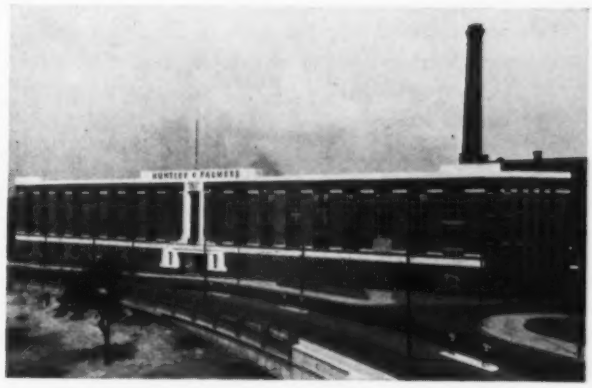
One of the eating habits which are peculiar to the other side of the Atlantic is the consumption—much in the same way and upon the same occasions as we indulge a kind of national failing for crumpets—of cinnamon toast. As its name may or may not convey, cinnamon toast consists of the blandishment of hot, butter-drenched toast by the further addition of a generous sprinkle of a mixture of cinnamon-flavoured sugar upon it.

The manufacture of cinnamon sugar for this purpose is the essence of simplicity in that the flavouring of castor sugar, either with ground cinnamon or with oil of cinnamon (or, more often, be it feared, oil of cassia), is all that there is to it. In the United States the product is marketed usually in small quantities of a couple of ounces or so contained in a handy glass or metal "salt sprinkler". Its sales are unbelievably large.

HISTORY AND BISCUITS

The story of Huntley & Palmer

1826 1937



By T. Crosbie-Walsh, F.I.C.

THE HOUSE of Huntley and Palmers is among the goodly number of centenarians of the food industry. Its history is one of prosperity and progress, uninterrupted by set-backs and the mischances of the difficult world conditions which synchronised with its early activities.

The business was founded in 1826 by Mr. Thomas Huntley, who traded for fifteen years as a confectioner.

Mr. George Palmer joined the firm in 1841, and thus was born the wide-world name of Huntley and Palmer. Business grew so rapidly that only five years later it was found necessary to move to larger premises on the portion of the site now occupied by the present factory in King's Road. In 1851 the firm was employing three hundred workpeople and had been awarded the Bronze Medal at the first International Exhibition held in London. Mr. Thomas Huntley died in 1857 and Mr. George Palmer's two brothers, Samuel and William Isaac Palmer, came into partnership, this partnership lasting forty years. By the year 1867 the firm exhibited at the Great Paris International Exhibition of that year and was awarded a Grand Prix (the highest distinction the Exhibition could confer, and the only Grand Prix given to the biscuit trade). From 1882 to 1897 the business still continued to expand, and at the date of Mr. George Palmer's death the number of workpeople had arrived at five thousand.

The three brothers had made many benefactions to the town of Reading, amongst which was Palmer Park.

During the next twenty-five years from 1897 to 1921 the management of the business was in the hands of the second generation of the Palmer family. The business has never stood still, and this is shown by the fact that at the Paris International Exhibition of 1900 the firm was awarded two Grand Prizes—one in the ordinary biscuit class and one in the class for biscuits for exportation.

The public services of directors of the firm were recognised by His Majesty the King by conferring a Privy Councillorship upon Mr. George William Palmer, a Baronetcy upon Sir Walter Palmer, and a Baronetcy upon S. Ernest Palmer for his great services to the cause

Fig. 3 (above).—". . . stocks are all passed over illuminated panels. . . ." In this picture glacé cherries are being inspected.

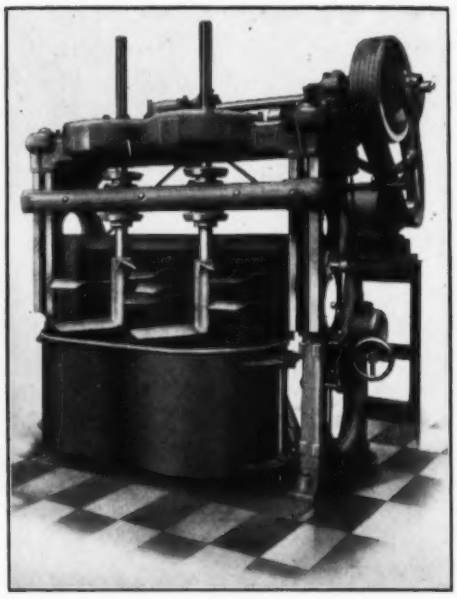


Fig. 4 (right).—Vertical biscuit dough mixer installed at Reading. (*By courtesy of the makers, T. and T. Vicars, Ltd., Earlestown*).

of music and as Deputy-Chairman of the Great Western Railway. About two years ago Sir Ernest Palmer was elevated to the peerage under the title of Lord Palmer.

During the Great War the whole resources of the business were placed at the disposal of His Majesty's Government. In the year 1922 an Executive Committee of the Directors was formed consisting of the third generation of the Palmer family, with the addition of Mr. Herbert Pretty, who had been created Managing Director, and a very strenuous time was experienced in dealing with the many difficult questions of the immediate post-war period.

On the death of Mr. Pretty, Mr. Clement H. Williams and Mr. E. A. Wrottesley were made Directors, Mr. Williams succeeding Mr. Pretty as Managing Director. The present Chairman is Mr. C. Eric Palmer, who has had a thorough practical training in all the various activities of the firm.

The Present Factory

The factory has an imposing approach: it is entered by way of a brick and stone building with four floors and a frontage of 300 feet. This building houses the new offices, which, having been recently constructed, has enabled the company to reorganise its clerical procedure in accordance with the most modern practice.

The entrance hall and staircase are beautifully designed. The floors (as in all parts of the building) are of compressed cork, and an elaborate conduit system has been laid under the floors, containing telephones, bells and power for operating machines—these services being drawn from floor boxes, thus keeping large quantities of wiring out of sight.

The "open office" practice has been adopted as far as possible, and the general office, which occupies the whole of the top floor, accommodates 200 employees and is entirely free from partitions. A feature of the private offices (excepting those in the Directors' wing) is that they are built with movable partitions, which, whilst conveying the impression of permanency, can be quickly dismantled without damage to the structure should a different layout be required. Such refinements as a vacuum-cleaning machine built into the building itself and other ultra-modern conveniences put the finishing touches to this handsome building.

The site is historical. It is the identical one upon which the original factory of Huntley and Palmer was built.

Ingredients of Biscuits and their Preparation

If one went no further than the raw materials departments of Huntley and Palmers, it would be sufficient to produce a permanent impression of the almost extravagant care and attention to details and to leave one convinced that not a single ounce of damaged material or foreign body could enter the huge production.

Flour.—The flour used is, for the most part, of English origin, a large proportion of it being produced in the nearby county of Berkshire.

Before being ready for use, the flour is re-sifted. This not only breaks up any possible lumps but aerates the flour. When it is necessary to use different qualities of flour blending machines are used.

Weighing is done automatically, the weighing machines being placed on the floor above the mixing plant, into which it is automatically delivered. This weighing is performed by a machine which carries out the various operations of mixing, blending and weighing, handles several blends of flour and discharges into several mixers.

Sugar.—Sugar comes into the factory in crystal form, which is milled to suit the various manufacturing requirements.

One mill separates six different grades of sugar in multi-chambered sifters. For grinding castor or icing sugar the sectional disintegrator reduces the sugar, without further sifting, to the highest degree of fineness. This type of disintegrator is well known and needs no detailed description here. One interesting point is that by the process of beating the sugar attains a temperature of

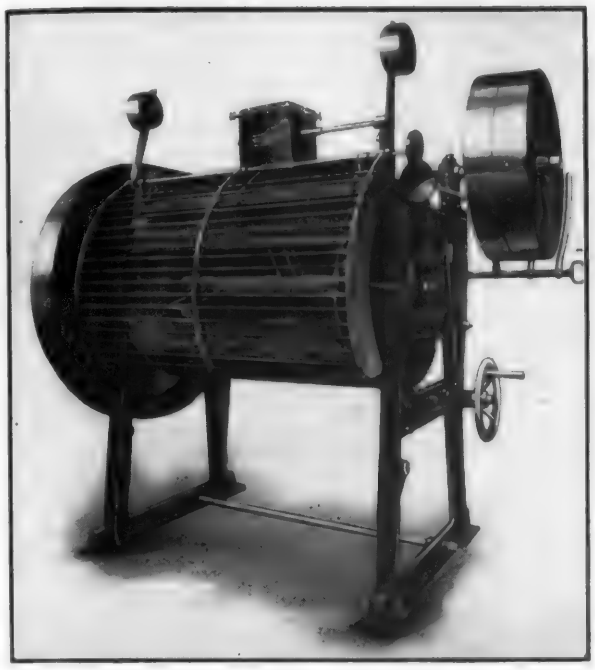


Fig. 5.—Cylindrical dough mixer. (*T. and T. Vicars, Ltd., Earlestown.*)

about 180° F., and any moisture is driven off. The resulting powdered sugar never cakes.

A very interesting type of sugar is the Barbardos sugar, which is specially imported in huge barrels containing nearly a ton of material. This sugar contains a certain proportion of molasses, which tends to separate. The barrels are therefore turned periodically to obtain a homogeneous mass. The maturation process for this particular sugar occupies several months, and the taste of the final product is extremely attractive and characteristic.

Butter.—Supplies are obtained from New Zealand, Australia, South Africa and Ireland. Butter and fats are reduced to a homogeneous mass in a fat-pulping machine, which works without heat. This pulping machine consists of a drum with a thick interior worm, which pushes the butter through a perforated disc revolving on the outside of the drum.

Fruits and Nuts.—Large quantities of almonds and dried fruits are used. The fruit-washing machines handle 6 cwt. of material per hour. The removal of stones, fluff, stalks and foreign matter is done automatically, but on emerging from the machine the fruit is received on a travelling belt, on each side of which sit a large number of girls who remove any damaged fruit. Over one part of the belt there is placed an electro-magnet, which removes any particles of metal that might have got mixed with the fruit.

This *personal* inspection of raw materials is carried out in a manner which must appear, to the uninitiated observer, little short of fantastic. Almonds are blanched in the standard machines, but the subsequent inspection, by a veritable army of trained operatives, reduces mass production to the nature of hand-work—an ideal combination.

Ingenious cutting machines for ginger, which slices lengthwise and crosswise at one operation, have been devised in the engineering shops of the company. Glacé cherries are bought already prepared and stoned. But the stocks are all passed over illuminated panels set in a bench. Girl operatives search for stones, which are readily detected by the transmitted light.

In the mind of the trained observer the question inevitably arises what such meticulous methods must cost. A further examination discloses the secret. It is, as has been suggested above, that an efficient combination of mass production and hand-work has been evolved.

Biscuit Manufacture

The flour, duly mixed with the various ingredients, is delivered to mixers of the "drum" and "vertical" type according to the sort of biscuit made.

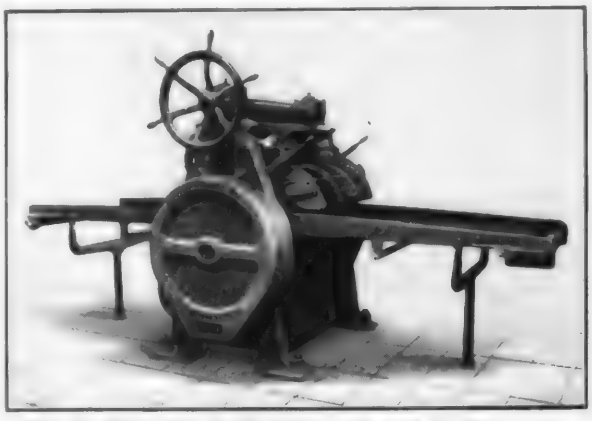


Fig. 7.—Reversing dough brake. (*T. and T. Vicars, Ltd., Earlestown.*)

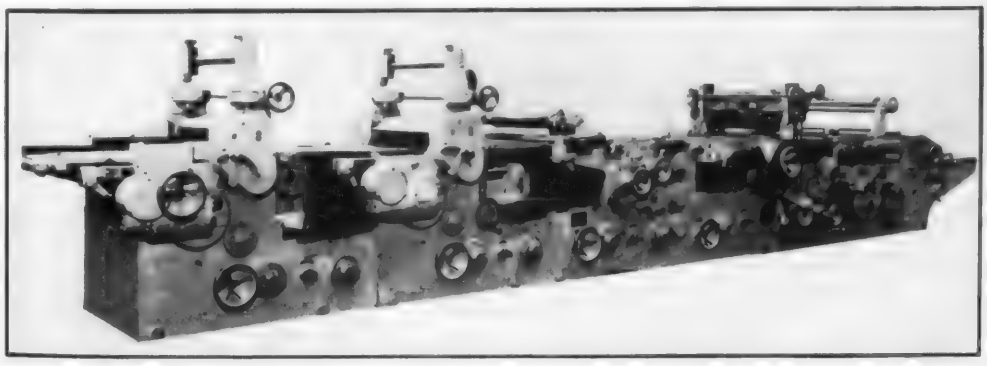


Fig. 6.—Cutting and panning machine. (*Baker, Perkins, Ltd., Peterborough.*)

Fig. 8 (above, left).—A huge biscuit-breaking machine which breaks defective biscuits into two or three pieces.

Fig. 9 (above, right).—International enrobers, showing the biscuits emerging from the chocolate bath and proceeding to the coolers.

Fig. 10.—Cake baking. The capacity of each oven is 480 slab cakes per day.

The drum type is used for hard doughs, whilst the vertical type is for soft and semi-soft doughs.

Braking.—After mixing, the dough has to be made into sheets of uniform thickness. Reversing brakes are used for this operation. The first run through the rollers reduces the dough to a fairly thick sheet. The rollers are then reversed, after lessening the distance between them, thereby obtaining a thinner sheet. This operation is repeated until the exact thickness is obtained. The sheets are now ready for cutting and stamping. But before this is done the dough is left to mature for a time—sometimes hours in the case of very elastic doughs.

Sheeting.—A sheeter is used for certain doughs to replace the reversing brake. In this case the sheets are fed directly on to the feed end of the cutting machine.

Cutting and Stamping.—This is done on high-speed, continuous running embossing, cutting and panning machines. These machines are characterised by high speed, adaptability and smooth running.

A glance into a little streak of romanticism penetrating into the hard white light of modern industrialism is afforded by the sight of a little hand-stamping machine which has been in use for 100 years, making "Jamaica" biscuits! It is embossed with the name "Huntley," and was in use before the creation of Huntley and Palmer—that is, prior to 1841, and doubtless used during the fifteen years that Mr. Huntley worked as an independent confectioner.

One girl works this machine all day, trimming the small biscuits after stamping them.

Pans.—For baking, the biscuits are placed upon pans. These are of various forms: plain, perforated solid iron or steel sheet, and wire mesh stretched and riveted to a sheet-iron frame.

The plain pans are used for such goods as Marie, Butter Finger, Shortbread, etc. Perforated pans have their use for semi-soft doughs. Wire pans are used for Petit-Beurre, Albert and similar biscuits.

Wire-Cut Machine.—Certain biscuits are made by this machine, which produces goods of equal weight and thickness with or without ripple surface.

Rout Attachment.—The dough is pushed by a plunger through discs and comes out in the form of a

ribbon, which is cut to the required length. This machine can be applied to practically any biscuit-cutting machine and makes a large assortment.

There are also attachments for making Garibaldi and similar biscuits.

Cream and Jam Filling.—A very large department is concerned with this operation. It is all hand-work and a numerous staff is involved. Honey is "piped" on the special biscuit.

Ginger Nuts.—It was somewhat surprising to gather that among all varieties Ginger Nuts are the most popular. Special mixing and preparation have to be accorded this line.

As in the case of the original ingredients, the finished products receive the most careful inspection. A staff of men are kept busy looking for distorted or over-baked goods. These are ruthlessly eliminated. Biscuits of all kinds, which do not come up to the self-imposed standard of Huntley and Palmer, are placed in a huge biscuit-breaking machine, which breaks them into two or three pieces. The resulting mixture is sold as "broken biscuits" —mainly locally.

Chocolate-Covered Biscuits.—These have a department to themselves. The biscuits run on travelling belts through the molten chocolate, and on through 60-foot coolers, at the end of which the biscuits arrive with the chocolate sufficiently set to pack.

The goods manufactured range from the well-known "Thin Captain" to the rich "Reading Shortbread". Intermediate come the "standard kinds"—"Osborne", "Ginger Nuts", "Petit Beurre", "Marie", "Butter Finger", "Thin Arrowroot"—which have been household words for a century. To meet modern requirements Cocktail specialities are marketed either singly or in attractive assortments. Particular pride is evinced by the company in their "Breakfast" biscuit, which they claim to be a unique product as regards flavour and texture.

Cakes

These form a large part of the work of the factory. The ovens used are the draw-plate, double-decker type and have a capacity of eighty 6-lb. cakes per charge. Each oven thus bakes 480 slab cakes per day.

The cake mixture is delivered to an automatic weigher, which delivers the correct quantity into the tins. There is a large export trade in cakes, which are sent out in the same containers as they are baked in, the tops being subsequently soldered. A vacuum is produced inside the tins which prevents the formation of mould when the cakes are exported.

Huntley and Palmers specialise in bride cakes. Facsimiles of those made for the marriage of the present King, then H.R.H. the Duke of York, and for that of H.R.H. the Duke of Kent are exhibited in the Bride Cake Department, and the different styles demonstrate the prevailing ideas of their periods, the latter one being characterised by greater simplicity of treatment.

Breakfast Food

During recent years, Huntley and Palmer have been manufacturing "Tribrek"—a wheaten breakfast food containing milk. The machine for making this was devised in the factory. Partially cooked flakes are produced on hot rollers, these are removed by a scraper, and, falling on to a travelling band, are carried into the oven, in which they are toasted. In order to retain the crispness of the flakes it is necessary to get them into airtight containers as quickly as possible. Waxed cartons are used.

Packing

Goods are packed in the well-known square tins, or in packets or special tins of many sizes and designs. For goods destined for overseas a top is soldered on to protect the goods from the ravages of insects.

A new package which is finding increasing favour is the "Drypack". This is an airtight carton which preserves the goods in perfect condition for a very long time. The carton comprises an outer shell of cardboard, which is completely impregnated by being passed through molten wax. The goods are then packed in a tray and this is put into the outer shell, the ends of which are

Fig. 11.—Bride cake decoration.

Fig. 12.—"Tribrek" flakes emerging from the oven.

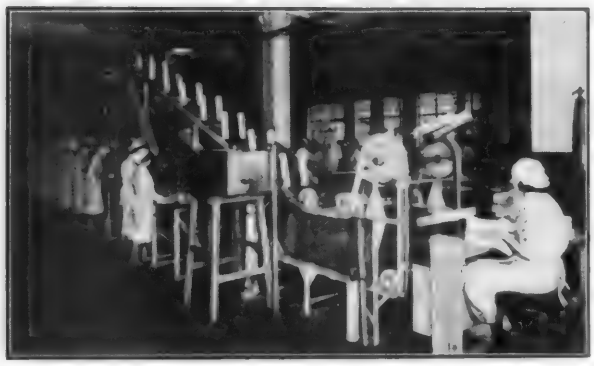


Fig. 13.—Carton waxing plant.

Fig. 14.—The control laboratory.

afterwards sealed by heat. The package is then enclosed in an outer wrapper. This is opened in a novel manner by pulling a thread, which cuts out the end of the carton, exposing to view the inner tray containing the biscuits. The insertion of the thread and all other operations in the manufacture of the carton is done automatically on high-speed machines.

Research is carried out in connection with all branches of the work of the factory, and the matter of the salvage of waste products is constantly dealt with. There exists a very close co-operation with the Engineering Department, whereby the development of new machinery for special products or purposes is dealt with.

Engineering Department

An A.C. bulk industrial supply is received from the Corporation of Reading Electricity Department at 3,700 volts, 3 phase, 50 cycle. This is distributed to sub-stations, transformed and converted for power, lighting and heat.

Process steam is supplied to the factory from a modern high efficiency steam generating plant, consisting of three 30,000 lb. per hour rating Babcock and Wilcox water tube boilers, the steam being generated at 250 lb. per sq. in. and superheated to 500° F.

Thermal storage fireless locomotives are used for shunting purposes about the factory yards, and receive their charges from a supply station at the main steam generating plant.

Experimental Department

This is equipped with a variety of small-scale machinery and plant, and is responsible for the production of new lines of products.

Chemical Control

The well-equipped laboratory is manned by a highly qualified staff of chemists. The usual control of raw materials is exercised. To the chemists are submitted such technical problems which occur not only in connection with manufacture but with packing, air-conditioning, fuel, water softening, tin washing and other matters. Adhesive manufacture is carried on by the laboratory.

Huntley and Palmers Bonus Scheme

The scheme of control was introduced with the main object of eliminating losses. More often than not these losses are hidden and cannot be cut out until the work has been accurately analysed and measured. The scheme accomplishes a twofold purpose—it enables cost reductions to be secured and at the same time places employees in the position to increase their earnings.

The standards to which operators have to work are guaranteed by the management, so long as processes, methods, equipment and machine speeds remain unchanged. A high degree of security in the matter of earnings is thus provided and the welfare of the employees also receives adequate attention.

Any output above the standards fixed produces a premium for the operator, the only limit of payment being the capacity of the individual operator.

For supervisors, managers, works managers and directors a comprehensive control sheet is written up weekly, which clearly points out losses, performance and costs.

Working Conditions

Rest-rooms are provided for women operatives and each workroom includes one qualified first-aid attendant. Morning and afternoon breaks of ten minutes in the work are allowed. Sick-visitors are employed by the firm, who keep in touch with sick employees in their own homes.

In order that every employee may have the opportunity of voicing opinions or grievances on any matter concerning the working conditions, what may be called a workers' parliament exists, which is known as the "Workers' Representation Committee", and is made up of elected representatives from all the workrooms. Meetings are held regularly, and at these the members can discuss any matters raised by their "constituents". The Chairman of the Representation Committee has at all times opportunity of access to the Board Room to lay any matters before the Chairman of the company.

Social Life

The Recreation Club has nearly 3,000 members. Every kind of outdoor sport and indoor recreation is catered for. The Directors provide the Club with two of the finest playing-fields in the country, having an area in all of 26 acres.

THE ACIDITY of PALESTINE OLIVE OIL

THE bulk of the olive oil produced in Palestine, unless rectified by artificial means, contains too much acidity for the requirements of foreign markets. There are two qualities: "Mouni", containing from 2 to 6 per cent. acidity, and "Tijari", which may contain anything up to 15 or 20 per cent. acidity. The latter is really only fit for soap-making or other industrial purposes, but much of it is sold on the local market as edible oil.

In connection with an investigation still in progress it has been found that oil expressed in the laboratory from selected olives has 0·2 to 0·5 per cent. acidity, while unselected olives gave 0·4 to 1·2 per cent. It is common practice, however, to store the olives in heaps for about 10 days prior to pressing in order that they may soften and more readily yield their oil, especially when the primitive hand press is used.

The fermentation which softens the fruit also, however, increases the acidity. In one such heap, for example, the acidity on the surface was 2 per cent. and in the interior 3 per cent. (on the expressed oil). In a sample kept in the laboratory for 10 days the acidity rose from 0·3 to 6·8 per cent.

The rise in acidity due to this initial fermentation is further increased by the unfavourable conditions still obtaining in many of the village presses. In one such establishment employing a primitive mule-driven crusher and hand screw-press the acidity of the oil in the olives before crushing was 4 per cent., while the oil as it came from the press contained 10 per cent. acidity.

Changes in acidity during the storage of the oil have also been taken into consideration. Samples of "Mouni" and "Tijari" oil from selected reservoirs have been examined monthly as long as any oil remained in storage. In eight months an initial acidity of 4 per cent. in the "Mouni" oil increased to 5·5 per cent., while in the "Tijari" oil 12·7 per cent. increased to 15 per cent.

Samples of fly infested and sound olives from the same trees have recently been examined, but there was no evidence that the infestation influenced the acidity of the oil.

The foregoing report on investigations relating to the acidity of Palestine olive oil by the Government Analyst, Department of Health, has been furnished to the Imperial Institute.

SHELLAC in the FOOD and CONFECTIONERY TRADES

Control of Arsenic Content

AS is generally known, shellac is one of the most important resins of commerce, and has been so long known that it would be difficult to fix the period of its introduction. Lac (once valued more for its dye than for the resin) is the excretion of a small insect which attaches itself to the twigs of certain trees found chiefly in India, Burma, and Siam. The resinous excretion of this insect in time covers its body and, thousands of insects being crowded together on each twig, in due time this becomes one mass of lac. At definite periods of the year the twigs are gathered, and the wood, dead insect bodies, the lac dye, etc., are removed by crushing, winnowing, and washing. The resultant small, hard grains are known as Seedlac which, after further treatment, yields the shellac of commerce. It is produced by a crude native method and also by mechanical means on recognised scientific lines.

Shellac has a considerable number of uses in the food, confectionery, and allied trades and, having in mind the Government regulations regarding arsenic, it is naturally of the greatest importance that users should be able to feel that they have a product which conforms absolutely to those regulations.

Orpiment as Adulterant

It has long been the native custom to use orpiment (arsenic trisulphide), the "golden paint" of the mediæval painters, as a regular ingredient. It is, of course, a highly poisonous pigment, and has been superseded in other industries by less poisonous compounds. Its use in shellac as an adulterant is to lighten the colour, both in the flake and when dissolved as a varnish, and thus to help the maker to sell an inferior product. Rosin also is added as an adulterant.

Following the tangle due to the shellac being heavily loaded with orpiment during the shellac speculation in 1935, the United States Shellac Importers' Association wished to have the orpiment content defined, and favoured the adoption of two types of shellac—(*a*) arsenicated, with a maximum of 0·25 per cent. orpiment, and (*b*) orpiment free. The first was not adopted, and it was finally agreed that "orpiment free" shellac should be allowed to contain 0·015 per cent. of arsenic or about 0·03 per cent. orpiment.

Manufacturers who make shellac by mechanical means maintain that neither orpiment nor rosin is necessary in the manufacture, and the range of shellacs so made is guaranteed free from orpiment and other adulterants. Users of native-made shellac should be cautious when using the product for coating confectionery, coffee beans, and the like. The wide use of this product in the canning industry stresses the importance of knowing the purity of the shellac used, and in thus being able to avoid troubles which may be consequent upon the presence of arsenic trisulphide.

We are indebted to Angelo Bros. (England), Ltd., for the information supplied regarding the production of shellac and the United States regulations.

BEETLE PESTS
of FLOUR and WHEAT

In the following article, Thomas H. Fairbrother, M.Sc., F.I.C., describes in detail the more common beetle pests which are encountered in the food factory, especially where flour and wheat are stored. Mr. Fairbrother is Chief Chemist of McDougall's Limited, and has written this article specially at the request of FOOD MANUFACTURE.

FIG. 1.—287. *Tenebroides mauritanicus* L.

MEMBERS OF the family of beetles are to be found in practically every food store or factory. They are not always obvious, as they usually only come out at night and during the daytime retreat to some nook or cranny, underneath floor boards or other hidden place. Their presence is always objectionable, not so much on account of the food they eat as the amount they damage and the potential nuisance they cause by excreta and general contamination. Some knowledge of the characteristics and general habits of the various beetles should be had by those who are in charge of food factories and are responsible for the purity of the products. Although every food factory has its own pests the insects do not necessarily confine themselves to one type of food; thus *Dermestes lardarius*, which is normally an animal feeder, has been found burrowing in nuts and cocoa beans, and, on one occasion, the writer discovered it inside a thick cardboard carton which had been neatly bored into perfectly circular holes. In this article, however, only those beetles that are associated with wheat, flour and bread will be discussed.

Cadelle (Fig. 1)

The Cadelle (*Tenebroides mauritanicus* L.) is of great importance as it is a common pest of stored products. It is about one-third of an inch long and has an elongated flattish oblong black or blackish body. It is very similar to the meal worms, but is smaller, and the thorax and abdomen of the adult beetle are very loosely jointed. The larva of these beetles is one of the largest of the grain-infesting insects and can easily be recognised. About three-quarters of an inch in length, it is fleshy, and the abdomen ends in two very dark, horny points. The larva is a chalky white, but the head, thoracic shield and the two horny points at the end of the body are black. Wherever flour, meal or grain are found over all the world this beetle occurs. Both larva and adult feed on grain and their speciality is to go from grain to grain devouring the embryo. It frequently establishes itself in ear corn that has first been injured by the Angoumois grain moth or by weevils. The cadelle is a long-lived insect, one of the longest-lived of those which attack stored grain, and cases have been known where the life of an adult has been as long as two years. The females can lay as many as a thousand eggs each, and they ovipost during the greater part of their lives. The white eggs are laid in clusters in the food material and in warm weather hatch in seven to ten days. The larval growth is from two months up to a year. When ready, the larvæ seek some secluded spot in which to pupate. Both larvæ and adults can exist for a long time without food. They will bore into the timbers of a bin and remain there long after the bin has been emptied, only to reappear when fresh grain is introduced.

It is generally accepted that the life cycle from egg to adult can be accomplished in about 70 days, but it is usually longer and may take a year.

The Confused Flour Beetle (Fig. 2)

This beetle (*Tribolium confusum*) is classed as a flour beetle because of its frequent occurrence in flour. It is a shiny beetle, reddish-brown in colour, and much smaller than the cadelle, being only about a seventh of an inch in length. The body is flattened and is oval in shape. The head and upper parts of the thorax are covered with tiny punctures. The wing covers are ridged lengthwise and

are sparsely punctured between the ridges. *Tribolium confusum* is a voracious eater of starchy foods and has been described as the worst insect pest of prepared cereal foods, but it has also been found on prepared chocolate.

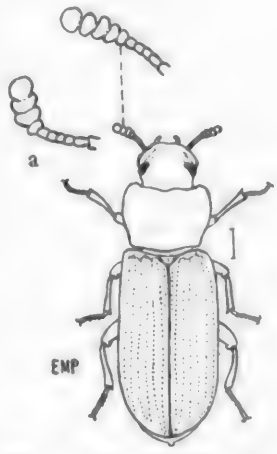


FIG. 2.—282. *Tribolium confusum* (*Antenna of Tribolium castaneum*).

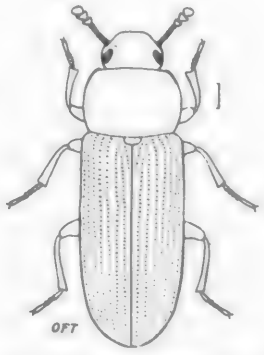


FIG. 3.—284. *Tribolium castaneum* Hbst.

The female lays her minute white eggs in cracks and crevices of bins, barrels or other containers, or even in the food itself. The eggs are coated with a sticky substance to which flour or meal adheres. On this account they stick to the sides of the container, and thus any fresh material added may become rapidly infested. The larvæ, which appear in 4 to 5 days, are slender and cylindrical and look like tiny worms. Fully grown they are about three-sixteenths of an inch long. They are a yellowish-white in colour. The last segment has two dark brown points or teeth. The insects feed on flour or any other cereral dust and when fully grown transform to small naked pupæ. These change from white to yellow and just before transforming into beetles they turn brown. The life cycle can be accomplished in about a month, but this may be considerably prolonged in adverse conditions.

Rust-Red Flour Beetle (Fig. 3)

Tribolium castaneum Hbst. (or *Tribolium ferrugineum* Fab.) is almost identical in appearance with *Tribolium confusum*, to which it is closely related, and can only be distinguished from it by the aid of a microscope. In *confusum* the segments of the antennæ increase in size gradually from the base to the tip, while in the rust-red beetle the antennæ are abruptly much larger than the preceding ones and this makes the antennæ appear as if suddenly enlarged at the tip. The margins of the head of the confused flour beetle are expanded and notched at the eyes, while the margins of the head of *castaneum* are nearly continuous at the eyes. Apart from these two physical differences the insect is very similar to the confused flour beetle in habits of feeding and breeding, and it is quite impossible to distinguish between the early stages of the two insects. Apart from damage caused by its feeding activities this insect imparts to any material it infests a foul and nauseating smell. Like the confused beetle, *castaneum* is a primary pest of milled products and not a primary pest of commercial shipments.

Spider Beetles (Fig. 4)

The white marked spider beetle (*Ptinus tectus*) is often found infesting stored grain and seeds, but it does not do a lot of damage. Its chief characteristic is its relatively long and thread-like antennæ, otherwise it resembles the bread beetle (*Sitodrepa panicea*), *q.v.* Its legs are long and the body rounded, and these characteristics have given it the name spider beetle. It is a very common beetle and an omnivorous feeder, and attacks all kinds of stored food. It does not confine itself to granaries and food warehouses. It is frequently found in dwelling-houses, living in cracks and crevices where crumbs, etc., may have lodged. It is about one-eighth of an inch long, is reddish-brown in colour with four white marks on the wing covers. The larva is white. There is another spider beetle (*Ptinus tectus brunneus*), but it only differs from the former in that the white markings of the wing covers are missing.

The Bread Beetle (Fig. 5)

Sometimes known as the drug store beetle (*Sitodrepa panicea* L.), is somewhat like the spider beetle. It is about one-tenth of an inch long and its wing covers are distinctly striated. It is cylindrical in shape and has a uniform light brown colour and its body is covered with a fine silky pubescence. Like *Ptinus tectus* this insect is a most omnivorous feeder and, according to the United States Department of Agriculture, it will eat anything except cast-iron. The female lays her eggs in almost any dry organic substance, through which the small, white larvæ tunnel, and when full grown pupate in small cocoons. The life cycle is usually completed in under two months.

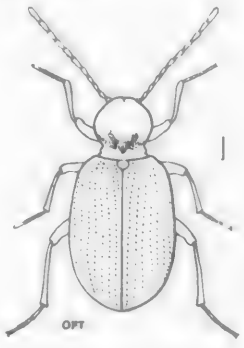


FIG. 4.—267. *Ptinus tectus.*

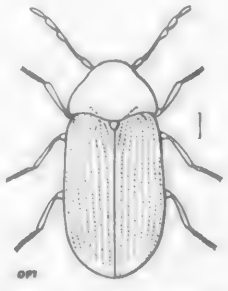


FIG. 5.—261. *Sitodrepa panicea* L.

The Saw-Toothed Beetles

This beetle [*Oryzaephilus* (*Silvanus*) *surinamensis* L.] (Fig. 6) derives its common name from the peculiar structure of the thorax, which carries six saw-tooth like projections on each side. The beetle is dark red-brown and is about one-tenth to one-twelfth of an inch long. The adults live usually from 6 to 10 months, but some-

times as long as three years. They are generally found in grain, rice and other cereals, but have been seen in other food stores. The female beetles lay from one to two hundred eggs, which are dropped loosely in the food or in the crease of the grain. The eggs, which are small and white, hatch in about four days. The emerging larvæ do not remain on one spot but crawl about actively, feeding in different places. They become full-grown in a few weeks and they then construct their cocoons by joining together small fragments of foodstuffs with a sticky secretion. Inside this pupal cell the larva changes to the pupal stage, which lasts about a week. The pale brown colour of the adult is due to hard plates on each segment. These plates do not completely cover the segments, and the last segment comes to a single point, which is usually a little darker brown. The life cycle can be accomplished in favourable circumstances in about four weeks.

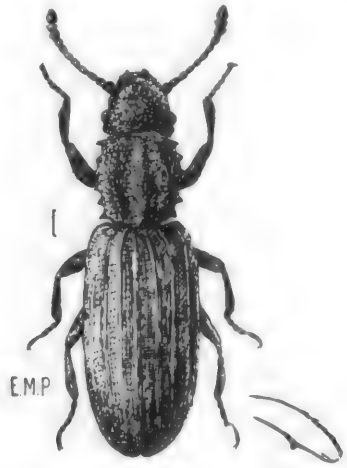


FIG. 6.—207. *Oryzaephilus* (*Silvanus*) *surinamensis* L.

Very similar to the *Silvanus surinamensis* is *Oryzaephilus* (*Silvanus*) *mercator*, known as the merchant grain beetle. It is similar in appearance and habits, but it differs from the saw-toothed beetle chiefly by the much narrower, more sharply projecting temples and in having the head and trochanters (second joint from the base in the leg) of the male unarmed.

Another beetle similar to the saw tooth is the square-necked grain beetle, *Silvanus gemellatus* Duv. It is alike in form, size and colour, but the square-neck has an almost square thorax and lacks the saw-tooth projections.

The Broad-Horned Flour Beetle (Fig. 7)

The broad-horned beetle (*Gnathocerus cornutus*) is so called because of the peculiar structure of the mandibles of the male beetle. These are armed with a pair of broad, stout horns. Otherwise it is very like *Tribolium confusum*, with which it is sometimes confused—indeed, there is scarcely any difference between the females of the species. It is a strong, reddish-brown beetle, about one-sixth of an inch long. It prefers raw materials to finished products, and is not so omnivorous as the other flour beetles and keeps itself to flour and meal. The adult beetles often live for over a year and the females lay from one to two hundred eggs each. The small white eggs hatch in four or five days, and the larva resembles that of *tribolium*, but can be recognised by the fact that the end segment ends in only one point or tooth, compared with two in the case of the *tribolium*. The life cycle can be completed in about eight weeks.

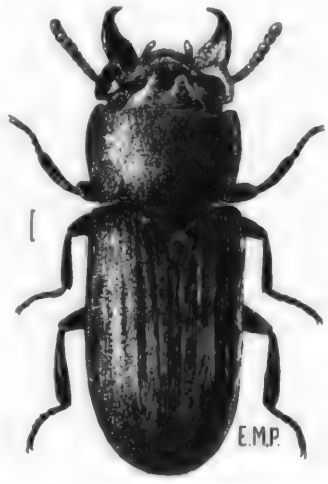


FIG. 7.—285. *Gnathocerus cornutus*.

The Slender-Horned Flour Beetle (Fig. 8)

Closely resembling the broad-horned flour beetle is the slender-horned beetle *Gnathocerus maxillosus* Fab. It has the same shape and appearance. It is about an eighth of an inch long and, in addition to its smaller size, it may be distinguished from the broad-horned flour beetle by the shape of the horns with which the mandibles of the male are armed. In this species the horns are slender and incurved. Its habits are similar in every way to the broad-horned beetle.

The Flat Grain Beetle (Fig. 9)

Sometimes known as *Laemophlaeus pusillus* Schön and sometimes *Cryptolestes pusillus* Schön (very closely re-

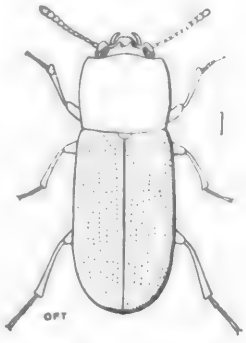


FIG. 8.—286. *Gnathocerus maxillosus* Fab.

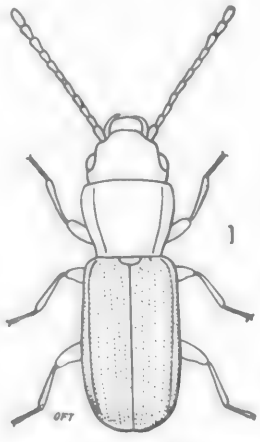


FIG. 9.—217. *Laemophlaeus ferrugeneus*.

lated to *Laemophlaeus ferrugenous*, Fig. 9), the flat grain beetle is a small, flattened, oblong, reddish-brown beetle about one-sixteenth of an inch long, with elongated antennæ which are longer than half the length of the body. The smallness of its body and the relative, unusual length of antennæ make it easily recognisable. It is the smallest of all the beetles. The antennæ are very fine and thread-like. All the joints have the same breadth and there is no club or increase in size at the tip. It is not a primary pest of stored grain, and apparently the adult cannot survive in sound, uninjured grain. It usually follows the truncated *calandra* species and scavenges round for the meal prepared by the boring of the *calandra*. It frequently infests grain or meal that is mouldy and out of condition. The small white eggs are laid in crevices or dropped loosely into starchy material. The larvæ are particularly addicted to the wheat germ, and in infested grain many kernels are completely uninjured except for the removal of the germ. The larvæ also feed on dead insects. When fully grown the larvæ form cocoons of a gelatinous substance, to which food particles adhere, and inside these they pupate. The insect has segments which increase in size from the head to the tip of the abdomen, which has two darker hooks or teeth on it.

The Small-Eyed Flour Beetle (Fig. 10)

This beetle [*Caenocorse* (*Palorus*) *ratzeburgi* Wissm.] is a tiny, flattened, shiny, reddish-brown insect, somewhat oblong in form and measuring about one-twelfth of an inch in length. It occurs all over the world and, while it prefers ground products in which to breed, it is not infrequently found in stored grains. This is found more frequently in America, and in Europe the closely related species *Palorus depressus* Fab. occurs more commonly.

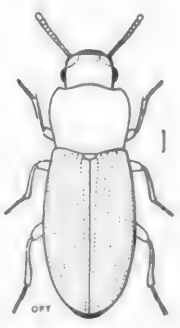


FIG. 10.—288. *Caenocorse* (*Palorus*) *ratzeburgi* Wissm.

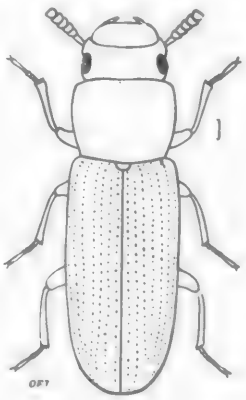


FIG. 11.—290. *Latheticus oryzae*.

The Long-Headed Flour Beetle (Fig. 11)

This beetle (*Latheticus oryzae* Waterh.) is slender and flattened, just less than an eight of an inch long. It resembles somewhat the confused flour beetle, but it is pale yellow instead of reddish-brown, and can be further differentiated by the peculiar shaped antennæ and by the minute canthus behind each eye. It has been reported from most parts of the world as infesting wheat, rice, corn, barley, rye, flour, etc.

The Meal Worms

The largest beetles found in stored products are derived from the meal worms *Tenebrio molitor* L. and *Tenebrio obscurus* Fab.

The yellow meal worm, *Tenebrio molitor*, is widespread over the world and is frequently found in stored grains. The adult of the yellow meal worm is a polished dark brown or black beetle just over half an inch long, with its thorax finely punctured and its wing covers longitudinally striated or grooved. The eggs are white and bean shaped, and are covered with a sticky secretion which causes the flour or meal in which they are placed to adhere to them. The larvæ which appear in about fourteen days are slender and white, but soon turn yellow. When full grown the larvæ are about an inch long and yellowish, shading to brown at each end and at the articulation of each segment. This class of beetles (part of the family known as *Tenebrionidae*) obtains its name from its preference for dark places and the nocturnal habits of the adults. During the day they conceal themselves with the larvæ anywhere where there is food and darkness. There is only one generation each year. This is due to the long larval period. The females are very prolific and may lay as many as five hundred eggs each. The larvæ are full grown in about three months, but instead of transforming at once to the adult stage they continue feeding and moulting until cold weather forces them to hibernate as larvæ. In late spring or early summer of the following season they pupate for about two weeks.

The dark meal worm (*Tenebrio obscurus* Fab.) is very similar in form, size and colour to the yellow meal worm, to which it is closely related. The adult beetle differs, however, in being dull pitchy black, in contrast to the shiny or polished dark brown or black of the yellow meal worm. The two species are often found associated, since their feeding habits are the same, but the overwintering larvæ of the dark meal worm begin to pupate earlier than the yellow ones and the adult beetles emerge a month or so earlier.

The foregoing descriptions cover the majority of beetle pests likely to be met with in granaries or storehouses of cereal products. This article has been restricted to the beetle class, and such pests as weevils, acarids, etc., have not been mentioned. These have been dealt with in previous articles in FOOD MANUFACTURE and also in *Food Industries Manual*. The writer is indebted for much of the above information to E. A. Black and R. T. Cotton, of the United States Bureau of Entomology, who have published a profusely illustrated description of stored grain pests in Farmers' Bulletin No. 1,260, issued by the U.S. Department of Agriculture.

[The illustratoins in this article are reproduced by kind permission of Prof. W. S. Patton of the Liverpool School of Tropical Medicine, and are taken from his book, "Insects of Medical and Veterinary Importance."—Ed.]

Technical Developments in the CONFECTIONERY TRADE

Edmund B. Bennion, M.Sc., Tech. A.I.C., of the National Bakery School, London, reviews some of the developments that have affected the trade during the past year.

DURING THE past year there have been few technical developments of major importance. With rising prices of raw material during this period, the closest attention has had to be paid to costs of manufacture to ensure a proper margin of profit. This has meant, in many cases, revision of recipes to balance up increased material costs. At the end of 1936 the question of almond supplies and their price caused such anxiety that some firms were compelled to use substitutes in order to market certain lines of cakes at the usual prices. This meant a lowering of quality, and it is doubtful whether the old quality will ever be regained.

Co-operation Attempted

During the year the wholesale cake manufacturers have tried to form an association, the main object of which is to secure some standards which would eliminate suicidal price-cutting competition. As a result of this co-operation, slab cake prices have been partly standardised, but attempts at bringing sponge goods into line have not, as yet, been successful. When attempts are made to introduce voluntary standards for such articles as cakes, the most comprehensive survey of the situation needs to be made, particularly when the ideas behind the standard are the regulation of competition in their sales. It is enough to decide that with sponge, for example, there should be two or three grades containing (say) 10 per cent., 20 per cent. and 30 per cent. eggs, but apart from informing the public of the egg content, such standard would be of no value to the trade as a means of preventing underselling and the marketing of inferior products at the same price as better products, unless great publicity were given to the scheme. Those who wished to use 15 per cent. eggs as a minimum instead of 10 per cent. would still be at liberty to do so. A standard would prevent the marketing of sponges containing no eggs, as sponge cakes in competition with egg sponges. Scientifically, it is possible to produce the most convincing-looking sponge cakes without eggs, but the development of such practice needs controlling because, so far as the ordinary sponge cake is concerned, people still buy them for children and invalids as a food, expecting them to possess nourishing qualities derivable from eggs.

Whilst all the sponge goods sold are perfectly wholesome, palatable and quite attractive when fresh, their composition varies largely at the present time.

Plain sponge, often termed the "penny sponge", retains its popularity, and the demand tends to increase. Swiss roll is very popular, the many different fillings in the form of jam or creams providing the variety which is so essential to-day. Cream-filled sponge sandwiches are popular, particularly at week-ends, but the demand for ordinary jam sponge sandwiches is falling away. This is also true for slab cake, the call for which has been declining since the boom years, when so many manufacturers entered the field, following on the success obtained by Scribban of Birmingham.

Whether this decline is due to a change in the public taste or to the production of a good deal of cheap cake of inferior quality is hard to judge. Both factors have probably played their part. It would seem worth while for manufacturers to concentrate on the medium quality cake, which will give them a wider margin of profit, in preference to the cheaper varieties on which the margin in profit is exceedingly fine, particularly when raw materials tend to rise as they have done during the past year.

Confectionery Plant

There have been no specifically new machines introduced during the past year. New combinations have been found advantageous in certain bakeries, whilst certain new semi-automatic units have been introduced. We understand that one such unit has been manufactured by Messrs. Baker Perkins, Ltd., for the production of the plain small sponge cakes at Cadby Hall. This unit includes a section for the cleaning, drying and greasing of the ordinary sponge frames in conjunction with the normal sponge air whisk and depositors.

Gas-fired ovens tend to become increasingly popular, and in new bakeries it is common to find whole bakeries of standard peel and draw-plate ovens gas-fired. For travelling ovens the pressure heating system continues to prove economical and efficient.

Cake-Making Methods

With the introduction of the hydrogenated vegetable shortenings twelve months ago considerable progress has been made and much interest has been shown by the trade. At the present time most fat manufacturers are marketing the products, and competition is becoming extremely keen. Development in production has been towards making the fats more easily creamed by reducing the toughness which was characteristic of the original fats. Progress was retarded at first because of the increased creaming time which had to be given with hydrogenated shortenings. Compared with the ordinary soft fats and margarine, this time seemed excessive and it was very

difficult to convince the confectioner of the necessity for it. With the modified texture, creaming time can be reduced, and the use of these fats is being investigated; since they possess such remarkable creaming and emulsifying properties, no confectionery can afford to neglect them.

One notable feature of such fats, apart from their excellent creaming properties, is the amount of moisture they will carry in a mix. In addition to this, their economic value is further augmented by the increased proportions of sugar which it is necessary to use.

For doughnut frying these fats are invaluable. There is nothing more objectionable than the smell which permeates those premises where doughnuts are being fried. This is because of the low smoke-point of ordinary oils and fats and the degradation of the fat which takes place during continued use. These hydrogenated shortenings have an exceedingly high smoke-point, in consequence of which frying takes place without smell and, because of the nature of the fat and method of manufacture, rancidity is retarded and breakdown by continued use is almost indefinitely postponed.

Cake flours, which should be used in conjunction with these new fats, have been slowly making progress and several new brands have appeared on the market.

The introduction of the American type of high ratio cake has made little progress as yet. This cake requires a very high sugar content in conjunction with the hydrogenated shortening, and a suitable cake flour which will carry the liquor must be used. The resultant cake has a very fine texture, has very tender eating crumb and keeps moist almost indefinitely. The only drawback to such cakes is that they are rather sweeter than the average, but it is likely that by dint of good advertising and proper marketing there would be a great demand for this type, for the public undoubtedly like sweet cakes. They should constitute quite profitable lines, since they give good bulk for weight.

Cake Decoration

Progress along modern lines is slow. The use of tints in colouring cakes has now become such a generally recognised practice that it is an uncommon sight to see a crudely coloured cake in any high-class shop. Generally, the use of colour is more restrained, and this may largely be attributed to the influence of art teaching in the technical colleges and the artistic work shown in exhibition. Coloured cakes increase in popularity, although the white cake is still the most popular. All the large firms who specialise in coloured cakes do a big trade—in some cases equalling and even exceeding those done in white. Whilst the round cake has for generations been popular for all types of decorative cakes, whether birthday, wedding or christening, other shapes, such as the oval, are popular. This may be understood because of their similarity to circular cakes in form.

Horseshoe cakes are popular for weddings. Square, hexagonal or octagonal shapes also find favour to a more limited extent. The modern style of straight line decoration has as yet a limited appeal.

Whilst there are those who will take the plunge and go a bit modern inasmuch as they will have a square cake, they ensure that the severity of style is taken off to some extent by the use of artificial decoration, such as heather, orange blossom, etc. Still, even to go so far is progress. The elimination of the old-fashioned scroll and lace work is a step in this direction of progress, for as soon as that style goes out artistry in its best form can be utilised.

It is a pity that exhibition judges have not always had an artistic training and so perhaps fail to realise the possibilities of artistic progress in the trade. If an artistic development were judged on the same plane as craftsmanship, many who win prizes as copyists to-day would never be placed. In the development of *gateaux* and "fancies" the trend of modern art training is shown to-day. Particularly was this evident in some of the excellent ideas shown in special Coronation lines. Even with biscuits and smaller products the influence of art was to be seen.

Research Work

In America considerable research work has been carried out and published. The question of the speed of reaction of baking powders and the influence of starch on the stability of powders has been considered. So far as the speed of reaction is concerned, an introductory note by R. M. Ladd was given. This question is a very important one, and no published information exists, although it is possible that such data exists in the files of individual firms. The influence of different starches as fillers in baking powders was considered by W. Gallay and A. C. Bell. Rice starch was found to be the most efficient, followed by wheat, corn and potato in this order.

The use of hydrogen peroxide as a leavening agent has also been tried for cakes in America. The main claim for its use seems to be that there is no residue from its use. Good texture, colour and flavour are also said to be obtained. These, of course, are not dependent on the normal aerating agent unless an excess is used. With hydrogen peroxide a slow baking must be used. It does not seem likely that this substance will become a popular aerator until its price drops considerably, although only 1·06 per cent. of the weight of flour is necessary.

Other researches carried out have been on the use of acid in the production of *meringues* to prevent the separation which normally takes place when albumin is whipped. Work has also been done on the form structure of icings, particularly boiled icings and the influence of beating time and temperature on their characteristics, by Charles A. Glabau and published in the *Bakers' Weekly*.

Work has been carried out in this country in many phases of cake work, but as most of it has been done in private laboratories the results are not available for publication.

USE for WASTE SHELL

WASTE cacao shell can be utilised as a cork substitute according to M. Pichard. It is pressed into blocks with a suitable binding agent (*e.g.*, water-soluble methyl cellulose) and exhibits good insulating and sound-absorbing qualities.—Bulletin Official Office int. *Cacao Chocolat*, 1937, **7**, 23.

["Food Manufacture" Photo.

Phyllis A. Peck M.C.A.

tells you to

Select the Right

FLOUR

for

PASTRY-MAKING

FLOUR TO a great many people is just flour. To those who manufacture it or handle it to produce confectionery goods it is a substance of very widely differing characteristics. To obtain the best results from it, the baker and confectioner must know what these characteristics are and how they are affected by the many ingredients which are assembled to produce cakes, pastries and breads. The housewife, on the other hand, generally orders her flour from the grocer week by week, sometimes by brand, sometimes not, and seldom troubles about the type sent to her if she obtains reasonable results from it.

Flour Characteristics

Wheats are graded "strong" and "weak". This means that the flour gluten is firm and strong or soft and weak, and upon this knowledge rests the decision of the confectioner and baker as to which flour should be used for pastry, which for cakes and which for bread. This knowledge of the right type of flour for the purpose has a great influence on the quality and value of the finished products. A strong gluten flour is elastic and pliable, capable of much handling and of absorbing liquids. These characteristics render it particularly suitable for bread making and for richer pastries on account of the various processes and handling which these classes of confectionery undergo. Such a flour would be quite unsuitable for cake making and for the more tender or crumbly pastries of the short variety, the texture and body of which should be tender and "melting". In between the two extremes of gluten strength there are grades of flour more suitable for general use, and for the particular confection under consideration in this article. Pastry as a whole requires a flour of medium gluten strength, one which will absorb and support a fairly large proportion of fat and water, and which will "accept" the handling which forms so great a part of pastry manipulation.

Types of Pastry

The varieties of pastries range from the richest known as puff to the plainest called short, and the complete list includes rough puff, flaky, suet, short and hot-water crust. Before considering the characteristics of each in detail let us examine the constituents of pastry.

Pastry Constituents

Flour.—Something has already been said of flour, which is the main ingredient, the quality of which must be the first consideration. It should be white; of a slight ivory tinge and with a sweet, nutty flavour; a smooth texture; and be quite dry and free from grittiness, impurities or adulterants. If possible, washing tests should be made to determine the strength of the gluten.

Fat.—A wide choice of fats is available for pastry, and as a large proportion is used and the flavour of the finished product chiefly influenced by it, this ingredient should be carefully considered, and a selection made which will best satisfy the conditions required. Undoubtedly, butter gives the most satisfactory flavour. Its nutritive value is high, and its flavour unsurpassed by any substitutes. Owing to the nature of butter substitutes, which are largely composed of vegetable or animal oils and fats, they are not so easily digested as butter and some lack vitamins and are liable to vary in their softening or "workable" property. The cost of butter, however, and its poor keeping quality, prohibit its general use, particularly in the trade, hence many kinds of butter substitutes are available; some resembling butter very closely in character and prepared chiefly with the idea of producing well-risen pastries of attractive appearance rather than those of good flavour, palatability and digestibility. For rich pastry such as puff, rough puff or flaky, it is necessary to choose a firm fat which will not soften or become oily as it is manipulated. Trade margarines and butter substitutes fulfil these qualifications and also keep well, and the confectioner is thus saved the trouble of washing and cooling (or hardening) the fat and so reduces the cost of materials and labour. For short pastry, a softer, more pliable fat is used, such as lard, or margarine and lard mixed, and these blend into the flour with little trouble by the method later to be described.

The choice, then, lies between butter, margarine and lard and dripping or one of the many commercial fats of vegetable origin less attractive but more satisfactory to work with, and giving more reliable results as regards appearance. Undue quantities of water and salt in a fat are unsuitable for pastry in that they tend to make for heaviness, hence the necessity for washing butter before it is used.

Salt should be added separately—not in the fat. It is an essential ingredient of pastry, and its chief value is to enhance the flavour of the other ingredients and to give body to the whole. One teaspoonful to the pound of flour is a general proportion.

Water.—Much of the fault found in poor pastry could be traced to the haphazard addition of this liquid. If a standard grade of flour is used it is possible to know exactly how much water it will absorb to produce satisfactory results, and to add it by rule of thumb is the first step to a variable or an inferior product. Certain conditions, however, allow of a little water variation, as in very hot weather when fat is soft and no method available for cooling and when fat is increased, or when it is melted as for pork pie pastry. To get the best results, water should be very cold for pastry making—never above 60° F. Water is added to produce a dough, to soften the gluten in order that the starch grains may easily burst and absorb fat quickly, thereby lightening the mass. Too much water overdoes the softening and the pastry bakes hard. The amount of water varies with the quality of fat used, and whether puff pastry (strong gluten flour) or short pastry (soft gluten flour) is being made.

GENERAL PRINCIPLES OF PASTRY MAKING

Aeration

Pastry is aerated by the method of introducing the fat into the flour, and the subsequent handling of the dough and, last but not least, by the heat of the oven. Air introduced either by rolling in, or mixing with the fat, expands on being heated, but by heavy or prolonged manipulation during the process, much of the lightness and value may be lost. Thus it is generally known that one person has a "light pastry hand" whilst another following precisely the same theoretical method has not. In certain pastries chemical aerating powders may be introduced, and this is generally done when the proportion of fat is small or when the method of making precludes the entrance of air by any other method, as in suet pastry. Self-raising flour of a good brand also makes very good pastry except of the very rich varieties, because it is generally made of a medium gluten strength flour, and the reaction of the chemicals increases aeration.

Oven Temperatures

The richer the pastry the hotter the oven. Wrong oven temperatures will undo all the care spent on the mixing. Oven thermometers are the only sure way of assessing temperature, and control may be by thermostat or by the person in charge manipulating the tap, switch or burner by hand. The following temperatures are approximately standard:

Puff pastry, 420° to 430° F.
Flaky pastry, 410° to 420° F.
Rough puff pastry, 410° to 420° F.
Short pastry, 400° F.
Hot-water crust, 380° F., lowering as cooking proceeds.
Suet crust, 380° F. (Not very frequently cooked by oven baking.)

Methods Employed for Addition of Fat

(*a*) The simplest method of introducing fat into flour is by chopping it up into extremely fine pieces and mixing with the flour. This method can only be practised when the fat is sufficiently hard, and it is, therefore, only used

PROPORTIONS OF INGREDIENTS TO 1 LB. FLOUR FOR PASTRY.

Type.	*Flour.*	*Fat.*	*Additions.*	*Water.*
Short ...	1 lb.	6-8 oz. May be butter, lard and margarine mixed, or dripping.	1 flat teaspoonful salt, sometimes 1 oz. sugar and 1 yolk of egg.	About ¼ pint or just over, according to weather and other conditions.
Suet	1 lb.	8 oz. beef suet.	1 flat teaspoonful salt, 1 flat teaspoonful baking powder.	About 1½ gills or just over.
Flaky ...	1 lb.	12 oz. butter or lard and margarine mixed, or one of the prepared fats.	1 flat teaspoonful salt.	About ½ pint or slightly under
Rough puff ...	1 lb.	12 oz. butter or butter substitute.	1 flat teaspoonful salt.	Slightly less than ½ pint.
Puff	1 lb.	1 lb butter free from salt and water, or puff pastry margarine.	1 flat teaspoonful salt.	A little under ½ pint.
Hot water crust or pie pastry	1 lb.	4-5 oz. lard.	1 rounded teaspoonful salt.	About ¼ pint of water or less according to the amount of fat used.

for *suet pastry*. The fat is generally beef suet, and it is either chopped by knife or machine into fine particles, easy of distribution or absorption.

(*b*) Rubbing or working the fat in with the fingers until it is so finely divided as to be undiscernible. Any of the fats already referred to may be used except suet. This method is employed for *short pastry*.

(*c*) Partly rubbing it in and partly distributing in knobs over the rolled-out dough, then rolling in. This method is used for *flaky pastry*.

(*d*) Distributing the fat in rough knobs throughout the dry flour then rolling in after a dough has been made with water, used for *rough puff pastry*.

(*e*) Enfolding the whole of the fat in one piece into a dough of flour and water. This is the procedure for *puff pastry*.

(*f*) Water and fat are melted together and added to the flour in liquid state; the method for *hot-water crust* or *pie pastry*.

Characteristics

It will be seen from these methods of introducing the fat into the flour that very different types of doughs are formed, and for the purposes of classification (*a*) and (*b*) are I, (*c*), (*d*) and (*e*) are II, and (*f*) III (a class of its own). The difference between them is that I produces a loose, crumb-like texture, crisp, short and tender without being rich or fatty to the palate. Class II produces a product in definite layer formation, the layers consisting of smooth, flat flakes of dough separated by wide or shallow air spaces according to the pastry. They are rich and are more greasy to the taste, are very light, crisp and fragile. Good rising is the aim in this class. Class III somewhat resembles I, but is firmer and more closely knit together, and always associated with savoury meat pies.

Essentials for Successful Pastry Making

(*a*) Right types of fat and flour.
(*b*) Cool fingers.
(*c*) Marble slab on which to roll the pastry.
(*d*) Cold water for mixing.
(*e*) Correct oven heat.

Short Pastry

Short pastry is the simplest to make and the most general for the average household. It lends itself to great variety and adaptability and is the most wholesome and digestible on account of the even distribution of fat.

The flour is sifted into a bowl with the salt, fat is added and cut into conveniently small pieces. This is to reduce the amount of handling and to keep the mixture as cool as possible. "Rubbing" fat in consists of dividing the fat finely into the flour by lifting both out of the basin with the fingers and rubbing the thumbs along the finger-tips from the little finger to the first, so letting the ingredients fall back into the bowl carrying cool air in their passage. This operation is continued until the contents resemble finely sifted breadcrumbs, with no lumps of fat showing anywhere. As already stated, coolness during preparation is the first essential, to allow for the maximum expansion of air in the oven, and the resultant lightness of pastry. Next, water is added. During this addition, stirring with a cold knife, converts the flour and fat into a soft, pliable and smooth dough, easily handled without stickiness, so that the basin is left quite clean and dry. The dough is now turned on to a pastry board or marble slab, lightly floured to prevent sticking, and is deftly and quickly moulded into a neat, compact mass with the hands. In order that an even shape results from the rolling, the pin must be perfectly smooth and round, otherwise pastry is uneven in thickness and the results will be poor. The method of rolling is of vital importance, since a heavy or uneven pressure will tend to make the dough hard and cause it to contract during cooking, thus spoiling the appearance and crumb of the finished article. The operation should be performed with both hands held lightly but firmly on the ends of the pin, the movement being backwards and forwards, using light, short and sharp strokes. Pastry should never be turned over, as the top will be the best surface for the outside, and the rolling-pin must not be used sideways, since there is then a likelihood of uneven pressure and consequent uneven thickness. Short pastry must be rolled once only, and, therefore, as many items as possible should be cut from the one rolling of dough. Scraps may be collected and used for less important pro-

ducts, such as turnovers and small tarts. These basic rules apply to all classes of pastry, and when once one type is mastered the other should follow equally successfully. All pastry should stand for a short time after rolling, thereby allowing it to settle down, and thus avoiding a tendency to shrink in the oven. Pastry must not be stood on ice, but if it is left for a short period it can be wrapped in floured greaseproof paper and then in a damp cloth.

Varieties of Short Pastry

To the foundation recipe may be added sugar for sweetening, and the yolk of egg to the water for mixing. This produces a richer and lighter pastry, suitable for flans or special sweet dishes.

Cheese may be added to the flour, fat, salt and water, and the dough made into cheese savouries. Yolk of egg is also a usual addition in this case.

Suet Crust

There is little difference between short pastry and suet pastry except that, in the latter case, the fat is chopped finely or otherwise mechanically prepared prior to mixing with the flour. Baking powder is generally added, or, preferably, self-raising flour used for aeration, since the rubbing in of fat by hand is omitted. A similar dough is made as for short pastry, but it is more usual to boil or steam it than bake it, though this method is also used, particularly for baked jam rolls.

Flaky Pastry

Success in this type of pastry depends largely on using the right type of flour and fat. It is necessary to use a flour with a stronger gluten than for short pastry, and the fat should be similar in consistency to the dough formed of flour, a small proportion of fat and the water. If this condition is not present, fat is apt to burst out of the paste and so spoil the layer formation which is the whole aim of this and the following three pastries. Flour and salt are sifted together into a bowl, and the fat divided into four portions, one of which is rubbed into the flour exactly as for short pastry. The dough is then formed by adding enough water to make a soft and firm pastry, which is neither sticky nor yet dry. It is now rolled into an oblong strip about ½ inch thick or slightly less, care being taken that the sides and ends are straight. The necessity for this becomes apparent when the dough is folded over upon itself to enclose the fat. One of the three remaining portions of fat is placed in smallish lumps over two-thirds of the strip, leaving empty the third nearest to the worker. This is folded over the middle third, and the top one is in turn folded over the two, so that a neat packet of alternate fat and pastry is ready for subsequent rollings. First, the open ends and side must be fastened together by pressure from the rolling-pin and the packet given one half-turn so that the folded end is either to the right or left hand side instead of at the top as before. The dough is again rolled out by careful short, sharp, forward and backward strokes, and this time it becomes a little longer and wider than the first rolling, but not thinner than about ¼ inch. The remaining portions of fat are used in the same way and the folding done as before until all fat is in. It is advisable to put the pastry in a cool place for 10 to 15 minutes between each folding and rolling so that it "settles" and becomes somewhat firmer. A final folding and rolling is given with no fat inside, and the pastry is then ready for use.

Rough Puff Pastry

It will be seen, by reference to the table on the preceding page, that the same proportion of fat is used for this pastry as for flaky, but in this case all the fat is added to the flour and cut up into small knobs. It is left in this state, and a dough formed with water just as if the fat had been rubbed in. Subsequent procedure, however, resembles that of flaky pastry, and five rollings and foldings are given until no streaks of fat are noticeable. This is an excellent pastry, and very useful for meat pies and savoury pastries, which are not required to be quite so light and superior in quality as puff pastry.

Puff Pastry

This is the richest type of pastry of all, since it has equal quantities of fat and flour. The flour should be strong and the butter firm, saltless and free from water, as for flaky pastry. Commercial puff pastry margarines take the place of butter and require no special preparation. There are several methods of making puff pastry, but the following is a general one and gives good results.

Flour and salt are sifted into a bowl and a portion of the fat is rubbed in as described for flaky pastry, and this is now kneaded or worked on the pastry slab in order to stretch the gluten and make it elastic. It is then rolled to a shape sufficiently large to enfold the butter, which is left in a neat, compact cake not too thick (about 1½ inches). The butter is placed at one end and the dough folded over it so that the edges just meet and can be pressed well together. The rolling-pin is placed here and there on the mass to begin the flattening process, and then it is rolled to an oblong strip about ¼ inch thick, as for rough puff and flaky pastry. It is then folded into three and left for at least 15 minutes in a cold place, covered by a piece of paper and a cloth; and in all seven rollings are given with a rest allowed between each two and again after the final rolling. From the dough are cut patties, *vol au vent*, and many fancy pastries and cakes which are supposed to be the test of a good confectioner.

Hot Water Crust

Unlike all other pastries, this one is made by boiling together water and lard and pouring them all at once into the sifted flour and salt. It is well mixed and then allowed to cool a little for the purpose of pie moulding. It is a pastry very different both in appearance and texture from any of the others and is solely used for cold meat pies. It is considered rich and somewhat indigestible.

Milk Made Digestible by Softening

By A. H. Pettinger, B.Sc., A.I.C.

HAVING REGARD to the great popularity of milk to-day, the establishment of the many "milk bars" and similar innovations, relatively few criticisms of this universal food have been heard, and rightly so. Whilst few foods can compare with this for all-round value and suitability for infant and adult alike, there are, however, possibilities for improving it slightly in various ways.

The fact that ordinary milk is intended specifically for the growing calf is sometimes not appreciated as fully as it ought to be. Among the common animals, the young rabbit makes the most rapid growth, and the mammary secretion is more rich and concentrated in salts and protein than human secretion, the mineral content is said to be 12 times that of human milk. The rate of growth of the calf is slower than the rabbit, but more rapid than that of a child, and the mineral content of cow's milk is accordingly some 3 times greater than that of human milk.

Presence of Calcium

It has been found that the presence of lime and other minerals in milk is the factor that determines the size and density of the clot when the fluid reaches the stomach. A milk rich in calcium tends to produce dense, hard curds which cause gastric discomfort, whereas a milk with less calcium gives a softer and more flaky curd, more readily assimilated.

With the intention of making cow's milk more digestible, Messrs. Lyman, Browne, and Otting, of the Ohio State University, proposed some years ago to subject it to softening with zeolite in order to reduce the lime content within the limits usual for human milk. Thus, just as water is softened and its lime content removed by passing over granules of a specially prepared silicate material, so the workers found that the calcium concentration in cow's milk could be reduced 20 per cent. by trickling it through a softener in a mildly acid condition (*Industrial and Engineering Chemistry*, Nov., 1933).

There is one very obvious drawback to the practice of removing the mineral salts ordinarily present in milk—namely, that the consumer loses thereby valuable metallic ingredients which he may need. Clearly, a much more satisfactory method of obtaining easier digestibility is to add some material which modifies the curdling process without causing the abstraction of some vital ingredient. In some hospitals it is usual to add a little sodium citrate to the milk given to invalids and others of delicate digestion. The citrate ion has some solubilising action on the calcium, which does not seem to have been explained. The writer has found that high concentrations of citrates restrain the precipitation of insoluble calcium salts. However, this property is only found in a very slight degree in citrates, metaphosphates showing this phenomenon to a much greater degree.

Softening Reagents

It is only recently, however, that the idea of softening milk by adding metaphosphates or polymetaphosphates has been patented, yet this is undoubtedly the most scientific manner of rendering that food more readily digestible while conserving all its valuable minerals. According to British Patent 446,529 to the Hall Laboratories Inc., of Pittsburg, U.S.A., it is possible to control the curdling properties of milk to the fullest degree by adding suitable amounts of hexametaphosphate. It is possible to prevent curdling altogether by reducing the calcium ion concentration with this reagent far enough.

In the above patent it is proposed to add small amounts of the reagent so that the milk curdles in a readily digestible form, with due consideration for any after-treatment which the food may have which might decompose the hexametaphosphate to orthophosphate when it loses its intrinsic power of dissolving lime. Boiling, for instance, breaks down the complex ion to the simpler phosphate radicle which is not effective, and so it is obviously necessary that if boiling or heating the milk is undertaken, the reagent must be added subsequently. Milk which is not to be heated above room temperature requires only the addition of 0·04 to 0·05 gram hexametaphosphate per 100 c.c., but somewhat greater amounts must be used in the case of milk intended for pasteurisation.

An interesting possibility is opened up by this invention—namely, the preparation of milk foods containing greater amounts of lime than is usually found in cow's milk when the administration of calcium is called for. Comparatively large doses of calcium in a readily digestible milk form may be prepared by adding to milk the calcium-sodium hexametaphosphate complex salt. There would appear to be considerable therapeutic interest attached to this proposal, as lime and calcium salts are not the only valuable metallic compounds soluble in hexametaphosphate; iron, magnesium, and aluminium also form soluble complexes with this remarkable compound.

SULPHURYL CHLORIDE in GREEN-FODDER PRESERVATION

THE A.I.V. method for the preservation of green fodder developed in the laboratories of the Finnish Co-operative Butter Export Association, originally employed a mixture of hydrochloric and sulphuric acids. It has recently been found that satisfactory results are also obtained by employing sulphuryl chloride mixed with water. The solution prevents decomposition of fodder rich in protein and comparatively poor in sugar.—*Chemical Trade Journal.*

CONNECTICUT AGRICULTURAL EXPERIMENTAL STATION

THE fortieth Report on Foods and twenty-eighth on Drugs of the Connecticut Agricultural Station summarises the work done during 1935 in connection with food and drug control.

A number of orangeade samples were examined. The regulation in Connecticut and other States requires that orangeade contain at least 15 per cent. of orange juice. In view of the fact that the vitamin C content of orange juice is stressed in advertising, some attention was paid to its content in the concentrates offered for sale. According to Bessey and King (*J. Biol. Chem.*, 1933, **103,** 693), the vitamin content of undiluted orange juice is about 0·6 mg. per ml. From analyses of ash and vitamin C (ascorbic acid) it was concluded that the samples examined contained from 12 to 18 per cent. of orange juice, but that the vitamin C content had suffered some impairment during manufacture.

In view of the recent prosecutions in connection with vinegar in this country, it is interesting to note that the ruling in Connecticut is that dilute acetic acid is not vinegar and may not be sold as such; but it may be sold under its correct name for food purposes if it is free from harmful impurities. A rule that might be well imitated in this country is that vinegar shall be labelled to show the kind or identity of the product. Some methods of analysis for differentiating between dilute acetic and vinegar are discussed.

Three methods of incorporating vitamin D potency to milk are recognised by the Milk Regulation Board of Connecticut: (1) Direct irradiation of milk, (2) addition of a concentrate of cod liver oil and (3) production of milk by cows fed with irradiated yeast. The three types must contain a minimum of 135, 400 and 430 units per quart.

In 1929 the American Medical Association established a Committee on Foods. The Council works in collaboration with Federal agencies delegated to administer the Federal food law on misbranding, but has no authority to impose its decisions. It allows manufacturers and distributors of food products to use its seal when all its requirements have been complied with. The seal is not a guarantee of a product, but signifies that the product, its label and all advertising matter relating thereto have been considered by the Council and nothing contrary to its rules has been discovered. Some of the conclusions arrived at by the Council are excellent, as will be seen by the following examples:

Statements or claims in food advertising with technical, nutritional, physiological or health significance shall be carefully phrased so as to be in complete accord with established knowledge and authoritative opinion.

Sleep-inducing claims are not permissible for specific food beverages because of their misleading character, implying the possession of unique sleep-inducing properties by the specific individual foods, and because they lead to grossly deceptive advertising practices.

Claims that the mastication of specific foods "keeps the teeth and gums healthy" and equivalent statements are meaningless, misleading and deceptive by implication and are not permissible.

The terms "sterile", "sterilised" and "sterilisation" shall be used in food advertising in their correct significance only. Foods processed to be free of pathogenic organisms or to keep sound and wholesome are not necessarily sterile—*i.e.*, free from viable micro-organisms.

Statements or claims referring to vitamin E in advertising to the public imply a need for special sources of the vitamin that is not warranted by present knowledge. Neither claims for vitamin E nor mention of the vitamin shall appear on food labels or in advertising.

The terms "whole wheat", "entire wheat" and "Graham" as applied to flour and bread are synonyms. These terms shall be used as food names, or as parts of food names, only when the sole cereal and farinaceous ingredient is whole wheat. Their use as names for foods with other composition is misinformative and misleading.

CHLORPICRIN as a FUMIGANT

IN these days of wars and rumours of wars, bringing with them their ghastly talk of poison gas, it is with great relief that we are able to turn to an article on the use of the lachrymatory chlorpicrin as an industrial insecticide and fumigant. Workers in factories filling chlorpicrin shells during the war were found to be practically immune to the ravages of influenza; an indication of the germicidal action of the gas. Becoming commercially available in America during 1925, chlorpicrin has been adopted by the grain and milling industry as a powerful yet comparatively safe fumigant which, beyond elementary precautions to safeguard those handling it, needs but little technique and is apparently economical—a little over a pint is needed to treat one thousand bushels of grain.

A valuable feature is that chlorpicrin irritates rodents to move from their hiding places to die in the open, and reports of lack of odour in the dead bodies gives rise to the thought that the organisms of putrefaction are also killed. Its use for soil treatment is receiving investigation, and a less happy aspect of its uses is that of bombs for police and as a protective device for bank vaults. Writing in the American journal *Chemical Industries*, March, 1937, C. C. Johnson has a happy, if unconventional manner of describing chlorpictrin as "A Tear-jerking War Baby" which, by its lachrymatory effect, "Sounds its own Siren".

DEMAND for CONCENTRATED WHOLE LIVER EXTRACT

THE continued efforts of biochemists to obtain a concentrated liver extract of greater purity and higher concentration for parenteral administration leads to the hope that in the near future the pure anti-anæmic principle will be available for clinical use.—*The Lancet.*

FOR YOUR INFORMATION

OBITUARY

Mr. Harold Carr

We regret to announce that Mr. Harold Carr, aged 57, of Millbrooke, Carlisle, Chairman of Carr and Co., Ltd., biscuit manufacturers, died last month in a Carlisle nursing home. He was a generous benefactor to various local institutions and a pioneer of air travel in Cumberland.

Sir Charles Saunders

Sir Charles Edward Saunders died last month in Toronto at the age of 70. His discovery and development of Marquis wheat was largely responsible for the rise of Western Canada as the leading exporter of hard spring wheat in the world. Born at London, Ontario, in 1867, Saunders was educated as a chemist and geologist at Toronto University, at Johns Hopkins, and at Harvard. He was for some time Professor of Chemistry and Geology in Kentucky.

KENT MILLER HONOURED

Mr. S. K. Keyes, Chairman of Daren, Ltd., millers, of Dartford, was recently presented with the Scroll of Freedom with silver casket admitting him as the first honorary Freeman of the Borough of Dartford. The Mayor of Dartford (Councillor Alec Webb) made the presentation on behalf of the Borough. Mr. Keyes said that he would not only continue his work for the town, but would redouble his efforts.

A. A. MAYTHAM BACK

We are glad to welcome Mr. A. A. Maytham, President of the Canning and Food Industries Club, back to England after his world tour. He has visited Egypt, Singapore, Borneo, Australia, New Zealand, Honolulu, San Francisco, and New York.

DIFFERENT COUNTIES, DIFFERENT FOOD

W. Buchanan-Taylor, Publicity Manager, J. Lyons and Co., Ltd., writes to the *Daily Express*:

"As your correspondent suspects, North Country folk have their own ideas about food and confectionery.

"They prefer hard centres in chocolates. They demand chiefly milk chocolate Easter eggs, whereas dwellers in the South also like plain ones.

"In restaurants North Country people order the more substantial dishes, such as steak-and-kidney pie, apple dumpling, etc. Fish and chips, veal-and-ham pie, etc., are eaten at teatime.

Tea follows every meal—not a cupful, but a pot, with plenty of hot water."

BAIRD'S NEW DISPLAY UNIT

Baird, Wolton and May have just adopted a new point-of-sale aid in the shape of the display unit shown in our picture. This unit has been distributed to a limited list of 500 retailers in London and the South of England, and those who have installed it are enthusiastic about it.

Fifty per cent. of the grocers want to keep the display for permanent use; others will return it for re-issue. The figure of the salesman is life-size, and colours harmonise with Baird's can labels. The facilities for display are flexible, and any or all of the range may be shown. With the display are sent supplies of leaflets and also of the recipe books compiled with the co-operation of Miss Janet Bond's Canned Foods Advisory Bureau.

DENTAL HEALTH

Mr. Walter Barrow, Pro-Chancellor of Birmingham University and a former managing director of Cadbury Bros., Ltd., speaking at the Health Congress of the Royal Sanitary Institute at Birmingham, urged the provision by employers of dental as well as ordinary medical services for employees. At Bournville, he said, three dental surgeons were employed, and all applicants for work were examined by them as well as the medical officer. They were not engaged until their mouths were in a satisfactory condition, and periodic examinations of the teeth were made afterwards. In consequence there had been a marked decrease in digestive and other troubles.

ROWNTREE WORKERS SAVE £18,000

Workers at Rowntree's chocolate and cocoa factory, York, drew out this year from their voluntary holiday savings fund the record amount of £18,000. This sum was voluntarily saved by 3,000 workers out of the total of 8,000 employed by the company, and paid into a fund which is operated through the York County Savings Bank.

In addition to his own savings, every employee who has completed more than eleven months' service received full pay during the week's holiday and for the Bank Holiday.

Some of the workers formed a party to visit Belgium, while others went to the Black Forest, Northern Ireland, and various English resorts, and about 70 of the boys spent a week in camp at Bridlington.

Forty new Austin cars lined up ready to be handed over to travellers of Batchelor's Peas at their Annual Conference. The fleet of cars created a stir during its progress through Sheffield.

BATCHELOR'S THREE-DAY CONFERENCE

Eighty Representatives Attend

Eighty representatives from all over the United Kingdom were entertained for three days at the Grand Hotel, Sheffield, by the Directors of Batchelor's Peas, Ltd., on the occasion of their annual sales conference. They were received by Mrs. E. H. Gasking (Chairman) and Mr. Maurice W. Batchelor (Joint Managing Director).

At the luncheon, many tributes were paid to the sympathetic treatment which the representatives had received at the hands of the Directors. An innovation introduced by Mr. M. W. Batchelor was the presentation of badges showing the name of the territory of each representative, who also wore the Batchelor house tie—a personal gift from Mr. Maurice Batchelor.

New Cannery

Later the representatives visited Batchelor's new cannery, now nearing completion, at Wadsley Bridge, and then a trip was taken into the beautiful countryside around Sheffield, where bathing and afternoon tea were indulged in. After dinner an impromptu concert was provided under the direction of Mr. Maurice Batchelor.

Mrs. Gasking foreshadowed big developments for Batchelor's Peas this season, following on the opening of the new cannery.

On their departure from Sheffield, forty of the representatives were presented with new Austin 10 Cambridge saloon cars, and the parade of this fine fleet created a stir in Sheffield.

Mr. Maurice W. Batchelor.
Presented badges—gave eighty ties.

GYE IS GOOD FOR YOU, TOO

Reference to a new product—a yeast extract entitled Gye—was made by Lord Iveagh, Chairman of Arthur Guinness, Son and Co., Ltd., at the company's annual meeting on Tuesday.

"Stockholders will be interested to hear that we have been selling a yeast extract," said Lord Iveagh. "This product, which we have called Gye—an abbreviation for Guinness' Yeast Extract—has met with so much success in Ireland that we may later decide to place it on the English market."

CANNED FRUIT IMPORTS UP

Export sales of Australian canned fruits since the beginning of 1937 have been record breaking. Sales to May 14 aggregated 1,400,000 cases or 400,000 cases more than for the same period last year. Of this amount Great Britain bought 1,250,000. Australia's 1937 canned fruit output filled about 2,328,595 cases. Domestic consumption is estimated at 800,000 cases, leaving approximately 1,500,000 cases available for export, plus the carry-over from the 1936 season.

NEW ZEALAND M.P. CONDEMNS SWEETS

Does He Know What They Are Made Of?

Mr. A. S. Richards, a New Zealand M.P., was reported to have said recently that if there was one thing that was undermining the health and constitution of the children of New Zealand it was lollies. He was opening a new school, and was surprised and angry to find that sweets were encouraged.

Australasian Confectioner, however, proved an able champion of the trade. In a fiery retort to Mr. Richards, they indignantly say: "Mr. Richards should be asked to produce his authority for this wild statement. He should be asked if he knows exactly what is in confectionery, exactly the effect on the human body of these ingredients, and exactly how sweets are made. He should be asked if he knows how much carbohydrate food a child needs and how all carbohydrates are digested; if he knows that confectionery is already three-quarters digested carbohydrate of the most rapidly soluble and easily absorbed type; and if he knows that sugar, by reason of its rapid and complete solubility, is less harmful to the teeth than almost any other foodstuff. He should then be asked if he considers the following things 'bad' for children: nuts, dried fruits, fruit juices, butter, milk, cream, egg yolk, cocoa butter, assimilable calcium and phosphates, gelatine, pectin and fruit acid. And he should then be asked if any other substances are used to any degree in any confectionery."

So far, no news of any reply from Mr. Richards has reached us!

BAIRD'S ASK JANET BOND

Among the first of the British canners to take advantage of the newly formed Canned Foods Advisory Bureau is Baird, Wolton and May, manufacturers of the famous Bairds canned products.

In conjunction with Janet Bond, principal of the Bureau, they have produced a booklet of canned foods recipes. Suggestions for lunch and dinner menus for a week are given with instructions how to make the dishes.

FINER FOODS

Seaweed and Moss

The Finer Foods Research Kitchen has been established "to fill the gap between producer and consumer" in the food industry.

The Director of Finer Foods Research Kitchen is Mary Gwynne Howell, first-class diplomée, Dom.Sc., N.T.S.C., London, and she is assisted by a qualified domestic staff and a food research chemist.

"Although I have been at work for only a few weeks," she tells us, "I have already succeeded in selling four new lines to preserve manufacturers and have several special goods under investigation at the present time."

Food Publicity

The objects are:

(1) To experiment with and prove the efficacy of newly discovered foods and food combinations.

(2) To create new recipes for food manufacturers.

(3) To suggest new methods of publicity for food products based on personal experience of housewives' interests.

(4) To encourage British housewives to join the Finer Foods Club and thus keep in touch with the latest "modes" in the food world.

(5) To produce a monthly "Food Bulletin" for distribution to 50,000 housewives. This will provide valuable publicity for firms who support the movement.

Catering For The Modern Child

Among the matters now receiving attention in the Kitchen are the nutritive values of carrageen moss and seaweed; it is hoped to find a way of incorporating these novel commodities in foodstuffs.

Miss Howell is also investigating thoroughly the relative quality of plants and vegetables sown at different phases of the moon. The theory that growth is affected by the moon is held by many horticulturists. Canned foods for "finicky" children will also be experimented with. It is hoped to make some unpopular foods attractive to the modern child.

Who said spinach?

▼ ▼ ▼

Tests of soil in West and South Cumberland have been made with the object of setting up a canning factory.

CANNED BEER EXPANSION

A paragraph in "Marketing Digest" feature, *World's Press News*, rightly credits increased tinplate production in the U.S.A. to the demand for canned beer. Bottle makers are becoming alarmed in America. *W.P.N.* goes on to say that "*several English breweries have started canning. . . .*" Actual number is 22; they can 41 brands of beer, and some brands have been on the market for a year.

The number of British brewers canning beer continues to grow; George Younger and Sons, Ltd., of Alloa, are the latest converts. Convinced that the degree of perfection and the definite demand for which they were waiting now exists, they have now joined the other British brewers already supplying beer in cans.

Younger's new can, supplied by the Metal Box Co., Ltd., has a simple effective design in blue and red on a buff background.

American beers in cans may be bought in this country, but the price is absurdly high, and there does not appear to be a genuine demand for the American beers at the present prices, except as a novelty.

WHY NOT MORE COLLAPSIBLE TUBES?

The use of collapsible tubes for packaging has been greatly extended during the last few years. A new development is the packing into collapsible tin tubes of foodstuffs such as potted meat, anchovy pastes, mayonnaise, mustard; even coffee, honey, butter and other commodities have successfully been packed into these handy containers.

Continental Success

Manufacturers in this country have been slow in taking to this new pack, but countries like Germany and particularly Switzerland are making continuous headway with it. This pack would in many instances offer advantages to the general public and also open up new possibilities of a substantial export trade. Foodstuffs packed in collapsible tubes are very handy in small households, for picnics, canteens, snack bars, to take along on a journey, or even for taking to work.

TWO SUMMONSES WITHDRAWN

Pearman & Corder in Boric Acid Dispute

At Whitley Bay (Northumberland) two summonses against Messrs. Pearman and Corder, Ltd., of Phœnix Buildings, Union Street, Sunderland, under the Food, and Drugs (Adulteration) Act were withdrawn when Mr. S. Strugnell (chief inspector, Weights and Measures Department) stated that the Government analysis of a sample complained of disclosed no boric preservative.

The charges were that the firm had sold certain chocolate biscuits to Backworth Industrial Co-operative Society which were mixed with boric acid so as to render the article injurious to health, and had given the Society a false warranty in regard to the article. The cases had been adjourned to enable a Government analysis to be made, after it was found that the analysis taken by the defendant firm and the Weights and Measures Department conflicted.

Mr. Strugnell said that the Government analysis agreed with that of the firm, and applied for the cases to be withdrawn, to which the magistrates agreed.

COLEY PLAN EXTENDED RANGE

Coley Thermometers, Ltd., the well-known manufacturers of vapour pressure type thermometers and gauges, are now well established in their new premises at London Road, Brentford, and report a very satisfactory increase in the production of their standard models. This company specialises in dial reading type thermometers, and very shortly a new model of this type of instrument will be put on the market.

The experimental department, under the able guidance of Mr. Bryan, the Managing Director, is busy extending the range of the company's activities and it is hoped to announce very shortly the details of many new types of instruments to be put into production.

CHEWING GUM BOOST SALES

A new competition is announced by Chewing Gum, Ltd., of Park Avenue, North Circular Road, N. 10 —makers of Bobby Gum and Pepsinets—in the shape of a picture story book contest, the prizes in which include bicycles, tennis racquets, cricket bats, roller skates and watches.

In each packet of chewing gum a transfer is included. This is part of a complete picture, which has to be assembled and transferred to a book.

Competitions of a similar nature have been held in America with conspicuous success.

CONVEYING AND SCREENING PLANT

We have received a collection of well-illustrated leaflets from Lockers (Engineers), Ltd., describing a particularly versatile range of plant for conveying and handling.

"Locker - Traylor" conveyors handle at the rate of from 1 oz. to 1,000 tons an hour; they are entirely electrical, and operate under some very difficult conditions uphill, downhill, or on the level. Of robust construction, these conveyors will stand up to a 24-hour day, and rate of feed is easily controlled. Thus they may economically be used for screening, drying, and cooling.

For screening all kinds of commodities, this firm also makes perforated plates and woven wire screens and belts in a variety of metals to suit the job. Wire belts are especially useful for the simultaneous conveying and washing of fruit. Lockers also supply machine and window safety guards as required by Government factory inspectors.

Pressure vessels, tar stills, hoppers, and tanks are other products illustrated in the leaflets, which may be had on request.

FONDANT MOULDS

Rubber moulds for creams and fondants are made by the Poppe Rubber and Tyre Company in two types; a fondant mould has 75 cavities and gives an assortment of ten different shapes at one moulding. Another model is for peppermint creams, and has 60 cavities.

COCOA-BUTTER SUBSTITUTE

In view of the recent increases in the price of cocoa butter, pressed stearine butters are receiving much more attention from manufacturers. One such commodity is L. E. Pritchitt and Co.'s Chocex Butter; melting point is 94° F., and it is being extensively used in chocolate making.

Another well-known line by this company has recently been issued in a new form. Their Lecithin, an emulsifying agent used in chocolate and toffee manufacture, is of higher concentration than formerly, and is now sold under the name "Chocoloid".

CHEWING-GUM NOT A DRUG

—Official

A panel patient in Manchester suffered from an inability to form saliva, and his doctor ordered him to chew gum. Eight pennyworth of gum, apparently, was sufficient, as this was the amount charged to the Manchester Insurance Committee by the practitioner.

The insurance committee took the view that this substance is a sweetmeat which would not ordinarily be a drug forming part of medical benefit, but as it might have been ordered in this particular instance for a therapeutic purpose the matter was one for determination by the panel committee. The doctor stated that the chewing-gum was prescribed not as a drug but rather as a mechanical device for the stimulation of physiological function. The panel committee decided that though the substance was properly prescribed for a therapeutic purpose they could not consider it to be a drug forming part of medical benefit.

Change of Address

The address of the Food (Defence Plans) Department of the Board of Trade is now as follows: Great Westminster House, Horseferry Road, London, S.W. 1. Telephone: Victoria 8585. Telegrams: Foodplans, Sowest, London.

Twice The Man?

Significant slip up by B.B.C. announcer one Sunday night: "Will Mr. and Mrs. ——, believed to be on holiday at Bournemouth, go at once to Worthington (I beg your pardon, Worthing) . . . !"

Yes, it *does* pay to advertise.

SOLUTION

Meat packers have always had difficulty in getting cattle to enter what is known as the "knock-pen," where they are killed. A Canadian packing company has found that by placing a sheet of mirror-finish Monel just at the back of the opening to this pen, the cattle see their reflections and, thinking the pen already occupied, do not hesitate at the entrance.

AIR CONDITIONING IN FACTORIES

Mr. C. W. Price (Home Office), speaking at a meeting of the Royal Society of Medicine recently, mentioned that the new Factories Bill would assist in bringing about more efficient air conditioning in many workrooms. In not a few factories advantages have already been far reaching. He asked to what extent in factories had complete air conditioning been adopted with advantage, and was doubtful if the regulation of humidity was in general necessary.

BATCHELOR'S ADVERTISING

Starting September or October, when their new cannery is completed, Batchelor's Peas, Ltd., Stanley Street, Sheffield, will launch an extensive Press campaign. Full pages in national and provincial dailies, home journals and women's magazines, supported by double-page spreads in trade papers, will be placed by Forbes Keir, Ltd.

GERMANY'S OIL

The cultivation of sunflowers on an extensive scale is being organised in Germany. It has been calculated that the cultivation of 10 cwt. of sunflower seed will yield 150 cwt. of edible oil and 600 cwt. of oilcake.

Institute of Hygiene

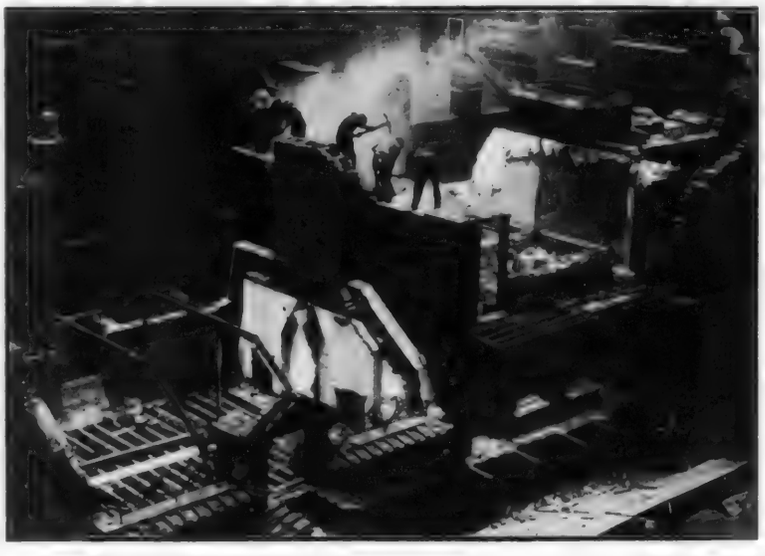
The Institute of Hygiene has been granted a Supplemental Royal Charter giving it power to amalgamate with the Royal Institute of Public Health. The amalgamated bodies will be known as the Royal Institute of Public Health and Hygiene.

And, finally—

We have tried to write this feature this month up to its usual standard. We sincerely hope that we have succeeded. But, if there be any shortcomings, reader, look at the picture below (taken from our office window), then shut your eyes, and imagine the infernal din that rises from this scene of demolition.

"The curfew tolls the knell of parting day,
The clink of trowels on bricks disturbeth me;
Pneumatic drills roar their destructive way—
TIME MARCHES ON — how noisily!"

With apologies to Stoke Pogos Churchyard.



IDLE CANNING CAPITAL

THE general manager of the South African Food Canners' Council has stated that capital of £100,000 intended for the erection of a vegetable canning plant is lying idle because the railway authorities are unsympathetic (says *Chemistry and Industry*). The Council wants the railway to carry a dozen 16-oz. tins of canned vegetables at the same rate as for canned fruit, but the latter will not agree. During the last three years the Council has worked hard to establish this industry, and the scheme has been approved by the Board of Trade and Industries, the Department of Commerce, and the Department of Agriculture. The administration replied: "It is appreciated that the selling value of jams and canned fruit may be higher than those of the canned vegetables, but the volume of traffic in the former much exceeds that of canned vegetables, and the larger and more universal consumption is an important factor in the extension of the lower rate of jams and canned fruit." The Council claims that if canned vegetables are carried at the same freight as canned fruit and jams, factories would be opened at Paarl, Wellington, and Germiston, representing capital of between £65,000 and £100,000. The factories would can beans, peas, tomatoes, sweet corn, tomato, and vegetable soups. The immediate annual capacities of the plants would be 3,000,000 lb. Within two years a modern sweet corn canning plant would be established to pack 4,500,000 lb. per year. This would be retailed at 4d. or 5d. per tin to bring it within the purchasing power of the natives, who were the largest potential buyers of the product.

A Modern DOUGH-TESTING Machine

By A. M. Marden, Ph.D., B.Sc., A.I.C.

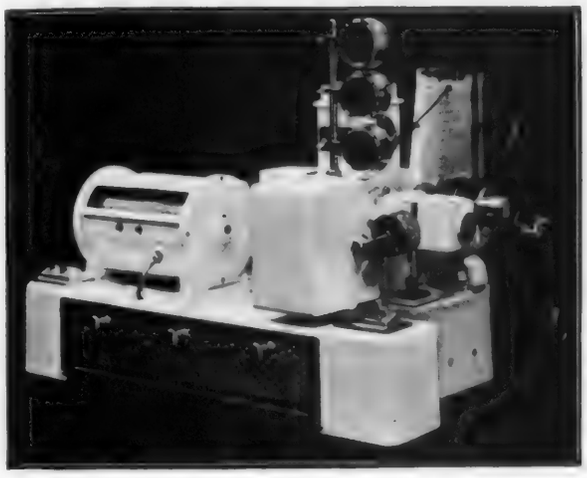


FIG. 1.—The extensograph, showing on the left the roll moulding machine, and on the right the dough extending arm and scale system.

IN THE January issue of this journal the increasing importance that is being attached by cereal chemists to the determination of the physical properties of doughs as a means of assessing flour quality, and some recent attempts in this direction, were discussed, but the article did not stress the fundamental differences that exist between the three attacks on this problem that have up to the present been made. These three are, in the order in which they have been attempted:

(1) Attempts to measure in an empirical fashion by distension (or extension) some function of the elastic and plastic properties of a dough—*e.g.*, the Bühler Comparator, the Chopin Extensimeter, etc., and the latest, the Brabender Extensograph.

(2) Empirical attempts based on the assumption that the resistance offered by a dough to continuous mixing is connected with the behaviour of the dough during fermentation—*e.g.*, the Brabender Farinograph, the Swanson-Working Recording Dough-mixer.

(3) Attempts to measure the real, fundamental physical properties of a dough, such as its elastic modulus and its viscosity, as made by Schofield and Scott-Blair [*Proc. Roy. Soc.*, **138** A, 707 (1932); **139** A, 557 (1933); **141** A, 72 (1933)], and by Halton and Scott-Blair [*J. Phys. Chem.*, **40**, 561, 811 (1936); *Cer. Chem.*, **14**, 201 (1937)]. See also Bohn and Bailey, *Cer. Chem.*, **13**, 560 (1936).

It seems fairly obvious that the success or otherwise of a flour in bread making depends on the existence in the dough of some definite relationship between, for instance, the elastic modulus and the viscosity, and thus it is practically certain that method (3) will sooner or later yield results of very far-reaching consequences, yet the difficulties that lie in this path are so great that it is probable that, commercially at any rate, more readily applicable results will be arrived at by the empirical methods (1) and (2) above. The usefulness of the Farinograph for the investigation of certain cereal problems is by now, for instance, established.

The Farinograph, however, suffers from an important limitation. It appears to be concerned solely with a flour as Nature made it, and takes no heed of the alterations in the flour produced by the art of man. The "improving" action of potassium bromate, for instance, cannot be detected by the Farinograph. This limitation is probably connected with the fundamental assumption upon which the machine is based, and thus will not be surmounted by any modification of this attack.

Elasticity and Viscosity

The first difficulty that arises in method (3) is the separation of elasticity and viscosity. To determine the elastic modulus of solids is easy, as is also the determination of the viscosities of liquids. But when one is dealing with a plastic substance such as dough, one is dealing with a combination of elasticity and viscosity. When a piece of dough is put under tension it extends, but it extends both elastically and plastically, and the extent to which elasticity and plasticity are concerned in the resulting strain is governed by the rate of extension. The matter is even more complicated, for, as Scott-Blair *et al.* have found out, the elastic modulus and the viscosity of doughs alter under stress, and also suffer from that annoying property, hysteresis. Physical methods for overcoming these difficulties have been worked out very ingeniously by these investigators, but there remains a difficulty which has not up to the present been overcome. The method they have worked out involves the use of a cylinder of dough, which has to be prepared by extruding the dough through a nozzle. Everyone who has handled doughs in a bakery knows to what extent their physical properties are altered by mechanical action. A dough after mechanical scaling is "dead" and "felled", and a certain "proof-time" is necessary before it has "recovered". Thus, although Schofield and Scott-Blair measure fundamental physical properties, and no empirical selection of properties, they are working with a dough in an arbitrary state—*i.e.*, the state produced by their extrusion apparatus.

It is true that a dough containing no yeast can be

allowed to "recover" in the cylinder form for some time before they extend it on their apparatus, but when yeast is present, the consequent gas production would cause distension of the cylinder in a manner that would interfere with the satisfactory working of their apparatus. Thus, yeasted doughs must be tested after a minimum recovery time, one that is in all probability too short to permit a satisfactory degree of recovery after the presumably very severe treatment the dough has received during extrusion. A method allowing the application of the Schofield-Scott-Blair technique, with equal ease either to yeasted or unyeasted doughs, would represent an enormous stride forward.

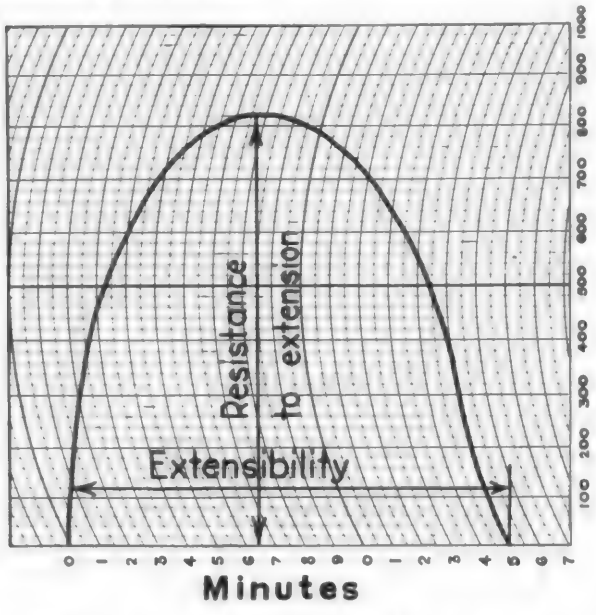


FIG. 2.—A specimen graph as produced by the Brabender extensograph.

Expert Control

It must be admitted that the preparation of a cylinder of dough in an unstrained state that is suitable for attachment to an apparatus permitting its extension under controlled conditions is a very difficult one. Moreover, methods of this character will probably always require the services of a trained physicist or physical chemist for their operation and the interpretation of their results. Although the writer would not for one moment wish it to be thought that he regarded this as a real objection, it is likely that for some quite considerable time to come there will exist flour mills, and more especially bakeries, in which the Directorate will not be able to see any prospect of an adequate return for the salary that such a technician would require. Thus, the development of an empirical method for testing some significant combination of the physical properties of a dough by a machine which would not require the attention of a trained scientist, and which presented its results in a form that could be understood and interpreted by any responsible person of normal intelligence who has had some scientific training and has a knowledge of flour milling and baking technique, would be extraordinarily valuable. If, in addition, the apparatus would permit measurements to be made on yeasted and unyeasted doughs allowed to rest for various periods, and would work with doughs from all types of flours—from the strongest Manitobas to the weakest Continental Inland—it would fill a very real need, and act as a very useful research instrument, provided that its limitations were kept in mind by the people interpreting its results.

The empirical instruments measuring the various properties of a thin sheet of dough (Chopin Extensimeter, Bühler Comparator, etc.) suffer from the disadvantage that work on fermented doughs is necessarily restricted to that on doughs which have had all the gas forced out of them, by severe mechanical action, some short time previous to the measurement. Messrs. Brabender O.H., of Duisburg-am-Rhein, have recently designed and put on the market a dough-testing machine of a novel type which avoids this difficulty. When a practical baker wishes to see how a dough is progressing he very often takes hold of the dough and pulls it out, noting how much resistance it offers and how far it will stretch before breaking. This new Brabender machine, the Extensograph, performs this test mechanically, and records graphically the tension in the dough and the extent to which it stretches.

The Extensograph

This machine, which must be used in conjunction with another Brabender instrument, the Farinograph, is shown in Fig. 1. A dough of standard consistency is first made in the Farinograph, and then is cut into two pieces each weighing 150 gm. These pieces of dough are formed into balls in a mechanical moulding machine under standard conditions, and are then formed into cylinders in a roll moulding machine. The dough cylinders are then transferred to special holders without being touched by hand, and allowed to stand for the required time in a fermentation cabinet maintained at constant temperature and practically 100 per cent. relative humidity. The ball-forming device and the moulder are also maintained at constant temperature by the circulation of water through special jackets. The dough holders (small "dough troughs") are then placed on the scale pan of the Extensograph itself. There is a gap in the centre of the scale pan and the dough holder, so that the centre portion of the dough cylinder is unsupported, but each end of the dough cylinder is prevented from slipping by a row of prongs which grip it firmly. The scale pan is connected to a recording balance of the type used to measure the torque reaction in the Farinograph, the weight of the scale pan, dough holder and dough being counterbalanced. The dough is now extended laterally by a hooked arm rotated slowly by a constant speed motor, the tension in the two strands of dough being measured and recorded by the balance. The ordinates on the resulting graph are proportional to this tension, and as the horizontal axis of the graph represents time, the abscissæ are proportional to the extension of the dough. The result is a graph of the type shown in Fig. 2. The height of the graph records what Brabender has called the "Resistance to Extension" of the dough,

whilst the length measures the "Extensibility". It will be realised that the units used are arbitrary, and that these terms are not correlated with an exact, physically individual property of the dough.

Practical Advantages

An arrangement of this type possesses quite a number of important practical advantages. Doughs of any type can be used, and they can be allowed to rest for any length of time before being tested. It is simple to use, and each actual test takes but little time, while as the results are recorded by the machine in the form of a graph, there can be no possibility of an operator recording erroneous values.

It has been found, the makers say, that this machine will very readily show up the results of wheat conditioning and treatment with chemical improvers. It will be remembered that the Farinograph fails in this latter respect. The effects of conditioning on the "extensogram" (*i.e.*, the graph drawn by the Extensograph) are particularly interesting and important, since they permit a record being made of the effects of any particular conditioning process on a wheat, and this instrument can be used to control the process of conditioning, a boon in a flour mill.

It is claimed that, broadly speaking, the area under the extensogram, which is roughly a measure of the strength of any particular wheat blend, remains constant, and that conditioning and treatment only alter the shape of the curve. To increase the area a stronger blend of wheats must be used. Thus the Extensograph should permit a miller to decide whether he can effect some necessary improvements in his flour by increasing the amount of conditioning or treatment he is giving it, or whether it will be necessary for him to increase the strength of his grist. Over-treatment of a flour is indicated by an unbalancing of the extensogram, the "resistance to extension" becoming great and the "extensibility" small, resulting in a high, narrow curve. An extensogram of this type corresponds to a short, tough dough, while a long, low curve is produced by a weak, extensible, "runny" one. A weak, short dough gives a "balanced" extensogram of very small area.

The changes brought about by fermentation in the extensogram of a given flour are interesting. As fermentation proceeds, the height of the curve increases and the length diminishes, so that treatment and fermentation result in similar changes. The addition of acid to a dough will also produce these changes, and part, at any rate, of the effect of yeast fermentation on the extensogram may be due merely to the rising acidity of the dough.

Research Data Obtained

An interesting paper has appeared recently [Zeisset, *Z. Get. Mühl. Bäck.*, **24**, 140 (1937)] in which is described the effects of certain milk products on the extensograms of a German flour, and the results of parallel baking tests, the whole investigation being carried out in the *Institüt für Bäckerei*, Berlin. The author found a very close correlation between results forecast from the extensograms in the manner very briefly outlined above and the actual effects found in the baking tests, account being taken the whole time, of course, of the effects of the various added substances on the rate of gas production, measured in this case by means of the Brabender Fermentograph.

There is thus evidence to indicate that the particular range of physical properties measured by the Extensograph is such that the measurements made by this instrument can be, to a very large extent at any rate, correlated with the behaviour of the dough in the bakery, and as the machine presents advantages such as the possibility of experimenting with fermenting doughs in an unstrained condition, and relative ease of use, it can be said to represent a definite advance in practical cereal science.

EDIBLE OILS in INDUSTRY

DIVERSION of edible oils to industrial uses is an expedient which might be helpful in southern Europe and northern Africa, where vegetable oils are relatively much more plentiful than mineral oils. For example, corn oil and rapeseed oil resemble olive oil in physical properties, and any of these can be processed for use in lubricants. When "bodied", either by blowing with air or by treatment with a silent electric discharge, these oils become soluble in mineral oils and so can be used in blended lubricants.

Olive, cottonseed, sunflower seed, rapeseed, linseed, and corn oils are less viscous than the petroleum lubricants, but they are superior in lubricity and adhesion to metal surfaces. They also have better properties at winter temperatures because their viscosity does not increase so rapidly in the cold. On the other hand, the vegetable oils are more sensitive to oxidation than the mineral oils; but this can be overcome by adding about 0·5 per cent. of an antioxidant such as naphthol, naphthylamine or pyrogallol.

Another important field for vegetable oils is their potential use as diesel fuels. They are barred from that use by their high price in normal economic conditions, but could be used very effectively when conditions demand it. The situation is similar with the well-known process (demonstrated by Mailhe to be feasible) for making gasoline from palm oil, cottonseed oil, olive oil or the like by catalytic decomposition in presence of copper turnings. The cost is prohibitive in the normal course of commerce and trade, but gasoline could be produced in this way in case of emergency shortage.—*Food Industries*.

INFORMATION and ADVICE

Rulings Regarding use of Preservatives—Glacé Fruits—Mushroom Ketchup—Formulae for Meat Pastes—Preservation in Syrup of Juice, Pulp and Skin of Oranges and Lemons—Bacteriological Standards for Milk—Green Tomato Pickle

Rulings Regarding use of Preservatives

2,561. *We would be very glad to become acquainted with the rulings regarding the use of preservative in the manufacture of foodstuffs, especially if methyl ester of para-hydrobenzoic acid may be used, and what percentage is allowed.* (London.)

We think it would be best to consult the subject as a whole. Full details are given in *Bell's Sale of Food and Drugs*, which we should be pleased to send you.

With regard to any doubt as to the admissibility of any special substance we suggest you get into touch with the Ministry of Health direct.

Glacé Fruits

2,563.—*As you have been kind enough to assist us with our production problems during last year, we trust that you will come to our assistance on this occasion.*

Can you give us the best method or an improvement on our method of drying green fruits (such as pineapple, figs, etc.) after these are impregnated with a thick syrup and prior to these treated green fruits being covered with a sugar (glacé) coating?

We dry the fruits in a wooden hot-room, which is subjected to a temperature of 80° to 100° F., allowing air at atmospheric pressure to enter the hot-room (without the help of a machine), thus displacing the hot air which escapes through an opening in the wall opposite the door of the hot-room. The average time taken for these fruits to dry is from four to five days. Could the period of drying be shortened by adopting another method? (South Africa.)

With regard to the best method, or improvement on your own method, of drying green fruits treated as you describe, we should say that there would exist two alternatives for speeding up the process.

One would be to increase the circulation of the hot air in your existing wooden hot-room by means, for instance, of fans. The other would be the use of vacuum drying. Unfortunately the literature very briefly dismisses the vacuum process for the drying of fruits as uneconomic, in comparison with processes having a larger output.

Mushroom Ketchup

2,565. *Will you please let us have a recipe for a good mushroom ketchup?* (Yorks.)

A recipe for mushroom ketchup appeared in our issue of July, 1933, in an article entitled "Mushrooms". Also in that issue appeared an article on Mushroom Cultivation.

We feel certain this issue would be of considerable value to you.

Formulae for Meat Pastes

2,567. *We are anxious to obtain suitable formulæ for the manufacture of various qualities of meat pastes—chicken, chicken and ham, etc., for packing in small jars.* (Co. Down.)

The formulæ for the pastes you mention are of course legion, and there is a very large difference between the quality of the meat pastes which the various manufacturers turn out.

Mainly such materials as corned beef, boiled bacon, tongue, fat chicken are used for meat and chicken pastes. Filler in the form of rusk or starch to the maximum amount of 10 per cent. might be used, although it is safer to keep it lower.

As mentioned, there is no typical formula. *Small Goods Production*, by Gerrard (Leonard Hill Limited) gives the following suggestion for ham and tongue paste:

Corned beef	3½ lb.
Boiled bacon	1 ,,
Boiled tongue	1 ,,
Butter or margarine	1 ,,
For seasoning:	
White pepper	½ oz.
Ground parsley	¼ ,,
Marjoram	¼ ,,
Cayenne pepper	⅛ ,,

Salt added at discretion and, if filling is added, the proportion of seasoning must be brought up to the required proportion.

We should be pleased to supply you with a copy of *Small Goods Production*.

Preservation in Syrup of Juice, Pulp and Skin of Oranges and Lemons

2,569. *Would you be good enough to give us information on the preservation of the juice, pulp and outer skin of oranges and lemons in syrup?* (Liverpool.)

Immerse ½-pipe of lemon skins in cold water for 48 hours, changing the latter two or three times, to ensure complete removal of the salt. Cook the skins in a wooden cask fitted with a steam-coil of copper. Run off the hot water until quite cold, then drain the skins in a basket.

Place the skins in cold syrup (8 cwt. of sugar to 48 gal. of water). Bring to the boil, skim, and transfer to casks or tanks. Allow to stand 24 hours and then dry off the syrup. Run the syrup into the pans and bring to boiling

point; after skimming run it over skins while hot and allow to stand for 24 hours.

Then draw off the syrup into the boiling-pans, add 1 cwt. of sugar and boil to 220° F. Return the hot syrup to the peel and allow to stand for 48 hours. Again draw off the syrup into the boiling-pans; add 1 cwt. sugar and boil to 225° F. Return to the peel and allow to stand for 48 hours. Repeat these operations for a third time, raising the temperature of the syrup up to 230° F.

Sweetened Juices and Syrups

Usually 1 volume of lemon juice and 3 of orange juice are mixed. A typical formula is 75 gal. of orange juice, 25 gal. of lemon juice, and 700 lb. of sugar. Stir to dissolve sugar. Preserve with one-tenth of 1 per cent. sodium benzoate.

In preserving syrup, sweetened juices and concentrates it is desirable to place the juice at once under a high vacuum (29 inch) to remove occluded and dissolved air in order to arrest oxidation changes. This should be applied long enough to remove all of the air. The addition of sugar greatly retards undesirable changes in flavour.

You will doubtless have seen a reply to an enquiry in the May issue of Food Manufacture, that the maximum quantity of sodium benzoate permitted by law is 600 parts per million. If sulphur dioxide is used as a preservative, 350 parts per million is the maximum allowed; this is generally added in the form of potassium metabisulphate.

Bacteriological Standards for Milk

2,574. *In an issue of* Food Manufacture *I was very much interested in the article "Testing Foodstuffs in Holland", but there is one point in it over which I am curious.*

Under the heading "Bacteriological Standards for Milk", it was stated that the indole method is used for counting B. coli. *Would you be kind enough to give me brief particulars as to how this test is applied for counting and if it has any advantages over counting in lactose bile or on MacConkey agar?* (Hankow.)

(1) "The Bacteriological Grading of Milk", Special Report Series, contains a very comprehensive survey of the whole problem.

On page 161, speaking of the production of indole during incubation in peptone water, this report states: "The formation of indole by itself can no longer be regarded as definitely indicative that a given strain belongs to the coli type. Several workers, we understand, have shown that a number of aerogenes strains can produce indole, while in an examination of 123 aerogenes strains 60 per cent. was found capable of forming indole. In our own series 10 per cent. of the intermediate and 12 per cent. of the aerogenes strains were indole-positive. It is noteworthy that all our intermediate strains forming indole came from milk. Indole-negative coli strains were by no means infrequent, forming, in fact, 18 per cent. of the total coli strains standardised. They were particularly common in raw milk, in which they constituted 43 per cent. of the coli strains."

These remarks clearly indicate that any method of counting *B. coli* which depends on the detection of the production of indole when the suspected material is incubated in peptone water, has no sound foundation. Indole production is not even mentioned in Ministry of Health Memo. 139/Foods (January, 1937), which gives details of the collection of milk samples and the standard bacteriological methods of examination to be employed for the new grading scheme.

(2) "The Bacteriological Examination of Water Supplies," Reports on Public Health and Medical Subjects. On pages 15 and 16 is described the indole test as one of a series to be used for the differentiation of the seven classes of bacteria which give a positive reaction in MacConkey broth. The bugs are incubated in peptone water (peptone 10 gm., NaCl 5 gm., distilled water 1·0001 ml., steam until all is dissolved, filter hot, adjust *p*H to 7·5 at R.T. tube in 5 c.c. lots and autoclave for 20 minutes at 15 lb.) for 3 days at 37° C. Then to each tube is added 1 ml. ether with vigorous shaking. The layers are allowed to separate (few minutes), then 0·5 ml. Ehrlich's reagent (*p*-dimethyl-amidobenzaldehyde 4 gm., alcohol (96 per cent.) 380 ml. conc. HCl 80 ml.) is added. If any indole has been formed the pink colour of rosindole appears within a few minutes.

Obviously, this test could be combined with a normal dilution procedure to form a counting method, but in view of the information given under (1) we don't think it would be worth while (it would count *B. coli*, fæcal type I: Intermediate type II.: *B. aerogenes*, type II).

Green Tomato Pickle

2,575. *Could you supply us with a method of manufacturing green tomato pickle?* (Australia.)

Tomato purée	25 gal.
Pale malt vinegar (16 grain) ..	8 ,,
Table salt	7 lb.
Gum tragacanth	1 ,,
White sugar	25 ,,
White pepper	8 oz.
Ground ginger	8 ,,
Ground nutmeg	4 ,,
Cayenne	1 ,,
Raw Onions	4 lb.
Garlic	½ ,,

Place the gum in 1 gal. of the vinegar to soak for 24 hours. Add 1 gal. more of vinegar to the gum, stir well. Peel the onions and chop fine. Place balance of vinegar in a steam pan; add sugar, salt, pepper, ginger, nutmeg cayenne, onions, and garlic, also the gum. Stir well, add the tomato purée, bring to the boil, stirring all the time, and gently simmer for 20 minutes. Shut off the steam and rub through a fine sieve. Fill and cap.

This should be sterilised in a water bath, temperature being brought up to 195° F. for 1 hour, remaining at this temperature for 15 minutes. Run off the water until cold.

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NEW COMPANIES

Apex Mills, Limited. (329,550). Apex Mills, Randal Street, Blackburn. To carry on the bus. of dairymen, mnfrs. of dried milk, mineral products, yeast products, etc. Nom. Cap.: £5,000. Permt. dirs.: H. Walsh and Ethel Walsh, 30, Wellington Street, St. John's, Blackburn.

Belsize Park Hotel, Limited. (330,246.) To carry on the bus. of private hotelkeepers, etc. Nom. Cap.: £200. Dirs.: O. Liebeck, Dorothy Liebeck and Elise Leopold, addresses not stated. Subs.: A. L. Holder, 69, Sherwood Road, Orpington, Kent (clk.); A. E. Tee, 18, Oakwood Hill, Loughton, Essex (clk.).

Cathedral Stores, Limited. (329,499.) 30, Southgate, Chichester. To take over the bus. of a grocer, confectioner, fruiterer and general stores cd. on by F. J. French at 42, West Street, Chichester. Nom. Cap.: £1,000. Dirs.: F. J. French, 30, Southgate, Chichester (permt. mng. dir.); Mrs. E. M. French, 8, Cawley Road, Chichester; Mrs. G. M. Stimpson, Ringwood, South Bank, Chichester.

Cocoa Investments, Limited. (330,206.) To acquire and hold shares, stocks, securities and property, etc. Nom. Cap.: £100,000. Dirs.: L. J. Cadbury, The Davids, Northfield, Birmingham; G. H. Boucher, Maybank, Leigh Woods, near Bristol; M. Tatham, 111, Middleton Hall, King's Norton Road, Birmingham; A. Whittaker, 58, Banbury Road, Northfield.

Cromptons (Preston), Limited. (330,251.) To take over the bus. of an egg and dairy produce mcht. cd. on by R. Crompton at 4, Penguin Street, Preston. Nom. Cap.: £500. Permt. dirs.: R. Crompton, 4, Penguin Street, Preston; J. Wilding, 7, Sparth Bottom Road, Rochdale.

Express-Food, Limited. (330,210.) 12, Highfield Court, N.W. 11. To carry on bus. as importers, exporters and mnfrs. of and dlrs. in provision goods, etc. Dirs.: L. I. Silber, 10, Highfield Court, N.W. 11; H. N. Feld, 12, Highfield Court, N.W. 11.

James and Day (Bakers), Limited. (329,607.) To take over the bus. of bakers and confectioners cd. on at 11, Woodland Terrace, Aberbeeg, Mon., as "James and Day". Nom. Cap.: £1,000. Dirs.: H. James, 1, Llanarch Terrace, Aberbeeg, Mon.; A. Parry, 43, Woodland Terrace, Aberbeeg, Mon.

Knowle (Great Missenden), Limited. (329,427.) The Knowle, Great Missenden. To carry on the bus. of hotel and restaurant proprietors, etc. Nom. Cap.: £800. Dirs.: Mrs. H. C. Beesley and Eveleen Williams, Clarendon House, Prestwood, Great Missenden.

Lax's Better Milk, Limited. (329,567.) Home Farm Dairies, Osgodley, Selby, Yorks. To carry on bus. as milk salesmen and dealers, etc. Nom. Cap.: £1,000. Dir.: R. L. Pennock, Penborough, 5, Park Road South, Chester le Street.

F. Leach and Sons, Limited. (330,184.) To take over the bus. of millers and mchts. cd. on by F. Leach and Sons at Wisbech, Cambs. Nom. Cap.: £10,000. Dir.: F. Leach, Roller Mills, Lynn Road, Wisbech (permt. mng.). Qual. of permt. mng. dir.: £1,000; of other dirs.: one share. Sub.: H. F. Trumpess, 48, Colvile Road, Wisbech.

Leslie and Anderson (Nairobi), Limited. (330,226.) 17-18, Billiter Street, E.C. 3. To carry on the bus. of dlrs. in coffee grown in Kenya, etc. Nom. Cap.: £5,000. Dirs.: To be appointed by the subs. Subs.: F. P. Chandler, Crunstal, The Friary, Old Windsor, Berks; J. C. Crane, 78, Grange Road, Leigh-on-Sea.

Mason and Company (Croydon), Limited. (329,475.) 90, Whitehorse Road, Croydon. To carry on the business of grocers, tea and coffee mchts., etc. Nom. Cap.: £1,000. Dirs.: R. Mason, Westbrook, 132, Grove Lane, S.E. 5; L. F. Packman, 95, Handcroft Road, Croydon; J. J. Goldsmith, 96, Whitehorse Road, Croydon.

Meadowland Dairy Company (Catterick Camp), Limited. (329,311.) To carry on the bus. of dairymen, etc. Nom. Cap.: £3,000. Dirs.: Major R. G. Wright, Tunstall Grange, Richmond, Yorks; R. Lawson, St. Martin's, near Richmond, Yorks; C. W. Tindill, Shute Road, Catterick Camp, Yorks.

S. J. Palmer (N/C), Limited. (329,391.) To take over the bus. of a tea importer and dlr. cd. on by A. F. Wilson at St. Crispin's Buildings, Low Friar Lane, Newcastle-on-Tyne, and elsewhere. Nom. Cap.: £5,000. Permt. dirs.: S. J. Palmer, 7, Bath Terrace, Tynemouth; G. A. Palmer, 7, Bath Terrace, Tynemouth; A. F. Wilson, 10, Brandling Road, Newcastle (ch.).

J. B. Peart, Limited. (329,239.) To carry on bus. as bakers, confectioners, etc. Nom. Cap.: £3,000. Permt. dir.: J. B. Peart, Oxford House, Mill Hill Lane, Derby.

Pick, Limited. (329,214.) To carry on the bus. of greengrocers, flower and vegetable salesmen, etc. Nom. Cap.: £3,000. Permt. dirs.: T. A. Pick, Deeping St. Nicholas, Spalding (ch.); T. R. Pick, Deeping St. Nicholas, Spalding; R. D. Jennings, c/o Mrs. Whybrow, 92, Queen's Road, Finsbury Park, N. 4.

Rogall's (Leeds), Limited. (330,273.) Spark Street Mills, Leeds. To carry on the bus. of sweetmeat mnfrs., etc. Nom. Cap.: £5,000. Dirs.: M. B. Rogall, 433, Street Lane, Leeds, 7; Mrs. D. Rogall, Ashburnham, Lidgett Lane, Leeds, 7; Mrs. M. Stone, 2, Halcyon Hill, Harrogate Road, Leeds.

Sarah Secord, Limited. (330,196.) Stratton House, Piccadilly, W. 1. To carry on the bus. of confectioners, etc. Nom. Cap.: £650. Permt. gov. dir.: Alice Marriner, 10, The Vale, Chelsea, S.W. 3. Remuneration of gov. dir.: £250 per annum.

A. Thompson (Aston), Limited. (330,234.) 96, Lichfield Road, Aston, Birmingham. To take over the bus. of a pork butcher, etc., cd. on by A. Thompson at Aston Cross and Aston, Birmingham. Nom. Cap.: £8,000. Permt. dirs.: A. Thompson, Rosslyn, King's Road, Colwyn Bay, Denbigh; A. J. Thompson, 744, Chester Road, Erdington, Birmingham.

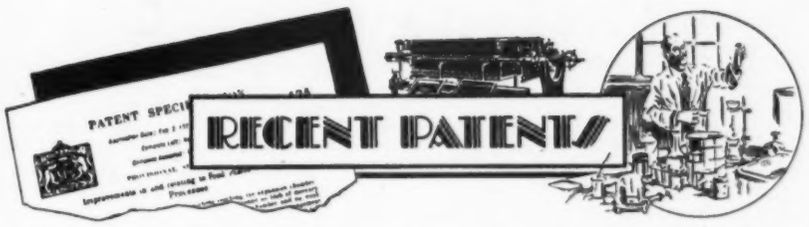
Trevora Products, Limited. (330,283.) To take over the bus. of food mnfrs. cd. on at 2a, Fern Grove, Liverpool, as "Trevor and Brown". Nom. Cap.: £1,000. Permt. dirs.: Mrs. M. E. Bibby-Trevor and L. W. Bibby-Trevor, 7, Alexandra Drive, Liverpool; R. N. Bibby-Trevor, 54, Nutfield Road, Thornton Heath.

Tucker's Dairies, Limited. (330,170.) 16, Bute Street, Luton. To take over the bus. of a dairyman cd. on by C. Tucker at Bedford. Nom. Cap.: £500. Dirs.: S. Ibbett, 71, Elstow Road, Kempston, Beds.; C. S. Tucker and Gladys M. Tucker, 326, Ampthill Road, Kempston.

Waterloo Sugar Estates (Trinidad), Limited. (329,141.) 21, Mincing Lane, E.C. 3. To enter into an agreement with Waterloo Estates, Ltd., Tate and Lyle, Ltd., H. G. Kleinwort, H. A. Andreae, E. G. Kleinwort, C. H. Kleinwort and the Drake Trust Co., Ltd., and to carry on the bus. of sugar planters, etc. Nom. Cap.: £450,000 in 320,000 pref. shares of £1 and 520,000 ord. of 5s. Dirs.: Rt. Hon. Baron Eltisley, 105, Eaton Place, S.W. 1; E. P. Andreae, Tandridge Court, Oxted, Surrey; W. J. Blanchard, Red Gables, Beech Avenue, Sanderstead, Surrey; W. Johnson, The Spinneys, Oakhill Road, Sevenoaks, Kent; R. L. M. Kirkwood, 5, San Remo, Kingsway, Hove; E. G. Kleinwort, Heaselands, Haywards Heath; W. F. Watson, Exchange House, Couva, Trinidad. Qual. of dirs (after company is entitled to commence business): £100. Remun. of dirs.: As voted by the company.

William Periam and Company, Limited. (329,487.) Victoria House, 8, Seaway Road, Preston, Paignton, Devon. To carry on bus. as fruit, flower and vegetable salesmen, etc. Nom. Cap.: £1,000. Dirs.: W. A. T. Kemp, 294, Union Street, Torquay; N. L. Newland, 3, The Avenue, Newton Abbot.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.



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Latest Patent Applications

18377. KELLY, T. D.: Beverages. July 2.

18592. BILLING, C.: Baking-powder. July 5.

18617. REAVELL, J. A.: Concentration of fruit juices, etc. July 5.

18691. MYERS, P. B., SARDIK, INC.: Preparation of pectin. July 5.

18810. MILLE, C.: Protecting fatty substances from becoming rancid. July 6. (France, July, 1936.)

19329. BARLOW, R.: Manufacture of non-alcoholic drinks. July 12.

19380. MCCHARLES, C. H., MYLVANY, H. A.: Preservation, etc., of egg-whites. July 13.

19619. AKTIEBOLAGET SEPARATOR: Method of determining the fat content in milk. July 15.

20612. DIXON, H. E. (GERNHARDT): Impregnating fruit, etc., with sugar, etc. July 26.

20717. NICORESTI, J. COFMAN: Dehydrating natural cellulose foodstuffs. July 27.

Complete Specifications Accepted

467,759. WARBURG, A. J.: Marking of cheese. (Cognate application 11819/36.)

467,857. WHITE, S. M.: Sweetmeat.

468,538. BIRNIE, F. R.: Apparatus for the preservation of mushrooms and other vegetables, and other perishable commodities.

468,642. GIUSTI, T., and GIUSTI, R. B.: Apparatus for cutting up materials such as ice-cream and nougat and coating them with chocolate or like sugar-containing substances. (Cognate Application, 1697/37.)

468,684. NAAMLOOZE VENNOOTSCHAP INDUSTRIEELE MAATSCHAPPIJ VOORHEEN NOURY AND VAN DER LANDE: Treatment of flour and the manufacture of means therefor. (December 4, 1934.) (Cognate Applications 33655/35 and 33656/35.)

468,799. ALLEN, H. E., and MCCALEB, A. G.: Meat-curing composition.

468,810. LUNDSGAARD, H. C.: Preparation of edible emulsions.

469,011. TRIGGS, W. W. (BEAU MAY PROCESS CORPORATION): Method of producing intensified fruit or vegetable juice preparations.

469,055. ALLEN, H. E., and MCCALEB, A. G.: Protein food colour and method of producing same. (August 1, 1935.)

469,112. CROSSE AND BLACKWELL, LTD., CLAYTON, W., BACK, S., MORSE, J. F., and JOHNSON, R. I.: Treatment of chocolate and materials for addition thereto.

469,113. CROSSE AND BLACKWELL, LTD., CLAYTON, W., BACK, S., MORSE, J. F., and JOHNSON, R. I.: Treatment of olive oil.

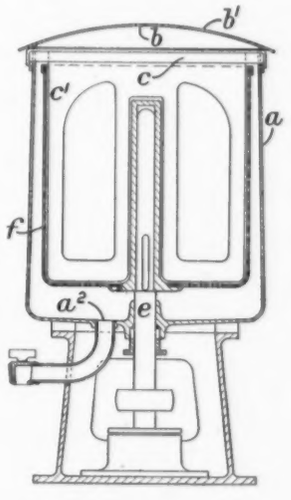
Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Abstracts of Recent Specifications

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume, or in bound volumes price 2s. each.

463,093. GROUP II. **Centrifugal machines.** CADE, A. F. (Baker, W. T.).

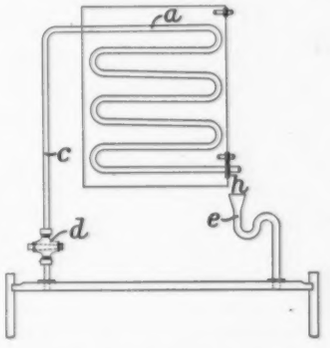
A centrifugal machine for pulping fruit, or the like, and separating the liquor therefrom has an open-topped perforated bowl *f* keyed to a shaft *e* and rotating inside a fixed casing *a*. Plates c^1 hang inside the bowl and are supported from a cross-bar *c* which rests in notches in the upper edge of the casing *a*. The central



portions of these plates are cut away to permit the pulp to rotate inside the bowl. The fruit is passed through the aperture b^1 in the cover into the rotating bowl *f*, where it is forced to the bowl wall and kept agitated by the plates c^1. The liquor and soft portions of the mass are forced through the perforations in the wall and are discharged from the casing *a* through the pipe a^2. The seeds and hard portions of the mass remain in the bowl, which can be stopped for cleaning.

463,350. GROUP VI. **Vinegar.** WILLIAMS, M.

An acetification vat for the production of vinegar is provided with a water-cooled condensing-coil *a* communicating with the vat by a pipe *c* having a tap *d* to regulate



the amount of air rising from the vat. Condensate flows to a trapped funnel *e* and returns to the vat. Air escapes at *h*.

465,111. **Improving oils and fats.** EKHARD, DR. W., Kreuzstrasse 17c, Berlin-Pankow, Germany.

Vegetable fats and other glycerides of fatty acids can be improved, according to the invention, in odour, taste, stability and consistency by intimate admixture with an aqueous solution of a fermentable sugar, which is subjected to intensive fermentation with organisms such as yeasts and bacillus bulgaricus. A suitable nutrient medium for the purpose of the process is Raulin's solution, a sugar solution containing ammonium salts, potassium carbonate, potassium silicate, magnesium sulphate, iron sulphate and zinc sulphate. Other ferments of a structureless character may also be applied—*e.g.*, pepsin, rennet and diastase—preferably in pre- and after-treatment of the fats and oils. The material under treatment is mixed or emulsified with the fermenting sugar solution, and after separation at the end of the treatment is washed with hot water. The effectiveness of the process is said to arise from the action of the products of metabolism of the organisms *in statu nascendi* upon the oil. The treated products possess a higher stability to heat and light. The process can be used to restore rancidified oils and fats to their original state and to produce fine tallow from raw tallow.

465,153. **Vegetable lecithin.** VOSS, H., FROMM, R., and MAU, J. (trading as Lehmann and Voss and Co.), Bieberhaus, Hamburg, Germany.

Lecithin preparations containing a relatively high concentration of lecithin in the form of hydrate are obtained by reacting the lecithin of a commercial vegetable lecithin-oil mixture with water in

presence of an alcohol at a *p*H ranging from 4·0 to 6·0. The process is based on the discovery that lecithin derived from a lecithin-oil mixture will, if freed from oil and brought into contact with water, form a gel under certain conditions. The resulting hydrated lecithin is readily diffusible with either oil or water. In this form, lecithin acts as a wetting agent for powders, textiles and the like. (Convention dates, U.S.A., October 27, 1934, and September 10, 1935.)

465,884. **Milk-like products.** CHRISTENSEN, C. H., 16, Oestergrade, Copenhagen, Denmark.
Products bearing a resemblance to natural milk products, notably in respect of easy assimilation, are obtained by heating and fermenting a pulp (of soya beans, maize, barley or earth nuts) with enzymes before emulsification of the fatty substance or oil therewith in order to reduce the proteins and carbohydrates to more soluble products. The watery pulp of ground and, if necessary, de-hulled soya beans, maize, etc., is fermented prior to emulsification with a vitamin-containing oil (cod liver oil). The mass is finally homogenised. Fermentation is effected on known lines with peptase or like enzymes. After gentle drying (*e.g.*, by spraying into hot gases) the final product is readily soluble in water or skim milk.

E.P. 466,158. **Peroxides for food preservation.** AUTOXYGEN, INC., 41, East 57th Street, New York, U.S.A.
Preservation of foodstuffs is effected, according to the invention, with the aid of an organic peroxide in quantity exceeding that required for bleaching. Examples are the peroxides of organic acids (lactic, capric, caproic, butyric, palmitic, stearic, etc.). Butter is preferably preserved with butyryal peroxide which slowly releases oxygen, the latter acting as the preserving agent while butyric acid, a normal constituent of butter, is formed. In the case of milk, the agent to be selected should be an organic peroxide derivable from a food constituent—*e.g.*, a peroxide of lactic acid, butyric acid, or other butter or fatty acid—and the recommended proportion is 0·1 to 2 per cent. of the weight of milk. Fatty acid peroxides are soluble in butterfat or cream and are therefore preferably mixed with separated cream before incorporating with milk. Lactyl peroxide, on the other hand, is soluble in water to some extent and can therefore be directly incorporated with milk. After addition of the peroxide compound the milk is placed in sterile containers and sealed. By the method described it is declared that raw milk can be kept indefinitely without material change in taste, flavour, digestibility and food value. Preservation of uncooked meat or fish in the uncooked condition is effected by immersion in a solution or suspension of a peroxide of a fatty acid derivable from meat or fish. Similar treatment is applicable to the maintenance of fruit and vegetables in their natural state and colour, the immersing medium being a 2 per cent. solution of a peroxide of a fruit or vegetable acid (citric, malic, tartaric, etc.). (Convention date, United States, August 1, 1934.)

LATEST TRADE MARKS

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal", and is published by permission of the Controller of H.M. Stationery Office. The "Trade Marks Journal" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

BARRETT'S BAKERINE.—576,792. **A preparation composed mainly of yeast being an ingredient in food for the improvement of bread and other foodstuffs of a like kind.** BARRETT'S FOOD CO. (PROPRIETARY), LTD., 60, Market Street, Melbourne, C. 1, Australia. (Associated.) August 4.
Registration of this trade mark shall give no right to the exclusive use, either separately or in combination, of the word "Barrett's" and the device of a wheatsheaf.

BLANCOL.—576,433. **Edible oils.** LIVERPOOL CENTRAL OIL CO., LTD., Irwell Chambers West, Fazakerley Street, Oldhall Street, Liverpool. (Associated.) July 28.
Registration of this trade mark shall give no right to the exclusive use of the letters L.C.O.C.L.

CAPTAIN. — 572,855. **Meat galantine.** DOWNS DISTRIBUTING CO., LTD., Downsdisco Buildings, 142-150, Goulburn Street, Sydney, New South Wales, Australia. (By Consent.) July 21.
Registration of this trade mark shall give no right to the exclusive use of the device of a plate of meat galantine.

DARIRICH.—576,796. **Cocoa.** SHUTTLEWORTH AND CO., LTD., 13, Galleywall Road, South Bermondsey, London, S.E. 16. July 28.

DODEC.—577,393. **Substances used as food or as ingredients in food.** J. S. FRY AND SONS, LTD., Somerdale, Bristol. July 28.

GOLDEN WREN. — 576,887. **Butter.** WEBER, LTD., 347 and 348, Central Markets, West Smithfield, London, E.C. 1. July 28.

HABIT. — 576,198. **Substances used as food or as ingredients in food, but not including pea soup or flour and not including any goods of the same description as pea soup or flour.** WESTERN MARGARINE, LTD., Alliance Factory, Western Avenue, Acton, London, W. 3. (Associated.) June 30.
Registration of this trade mark shall give no right to the exclusive use of the word "Habit".

JOTCO.—578,145. **Tea, coffee, cocoa, chocolate and chicory.** JOSEPH TETLEY AND CO., LTD., 49, Mansell Street, London, E. 1. (Associated.) July 28.

MELBA. — 572,360. **Cake powders.** CHARLES GOLDREI, trading as Ch. Goldrei, Foucard and Son, Goldex House, 56 to 60, Newcomen Street, Borough, London, S.E. 1. June 30.

RED FLAKE.—575,953. **Fish, tinned meat and tinned fruit.** HAROLD SIDWELL, trading as Sidwell and Co., 28, Monument Street, London, E.C. 3. July 28.
Registration of this trade mark shall give no right to the exclusive use of the words "Red Flake".

TRAPEZE. — 577,487. **Powdered substances for use as foods or as ingredients in foods.** G. W. MARSDEN, LTD., Firth Street, Huddersfield, Yorkshire. July 14.

STANBRAN.—577,558. **Baking powder.** STANDARD BRANDS, LTD., Aldwych House, Aldwych, London, W.C. 2. (Associated.) July 7.

VIL-VIN.—577,504. **Vinegar.** FENWICK AND SONS, LTD., Villa Mineral Water Works, Hylton Road, Sunderland, in the County of Durham. June 23.

VITA GLUCOSE. — 576,779. **Glucose tablets for food.** A. L. SIMPKIN AND CO., LTD., Chemists' Confection Works, Hunter Road, Sheffield, 6. July 7.

WELCO.—574,487. **Chocolates and toffees.** JOHN ROTHWELL, LTD., Newton Street, Droylsden, Manchester. (Associated.) July 14. (By Consent.)

WE-TEN.—577,071. **Prepared wheaten flour used in the manufacture of bread, confectionery and the like goods.** WE-TEN, LTD., 57 and 59, Cedar Street, Manchester. July 14.
Registration of this trade mark shall give no right to the exclusive use of the word "We-ten" or of the device of a loaf of bread.

567,208.—**A substance containing coffee, used for making a beverage.** JOSEPH HENRY CHAPMAN, 51, Thornleigh Road, Horfield, Bristol. June 23.
Registration of this trade mark shall give no right to the exclusive use of the letters "U.G."